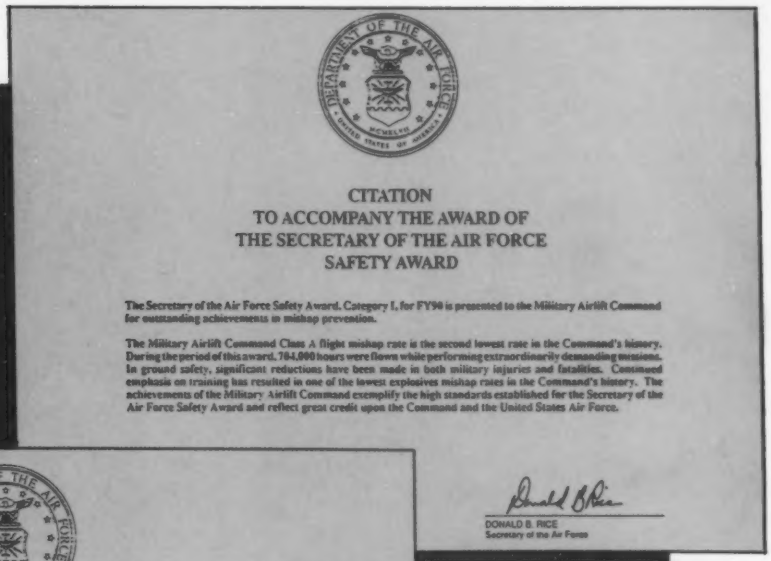
TMF

April 1991

THE MAC FLYER - For Greater Safety in MAC Air Operations

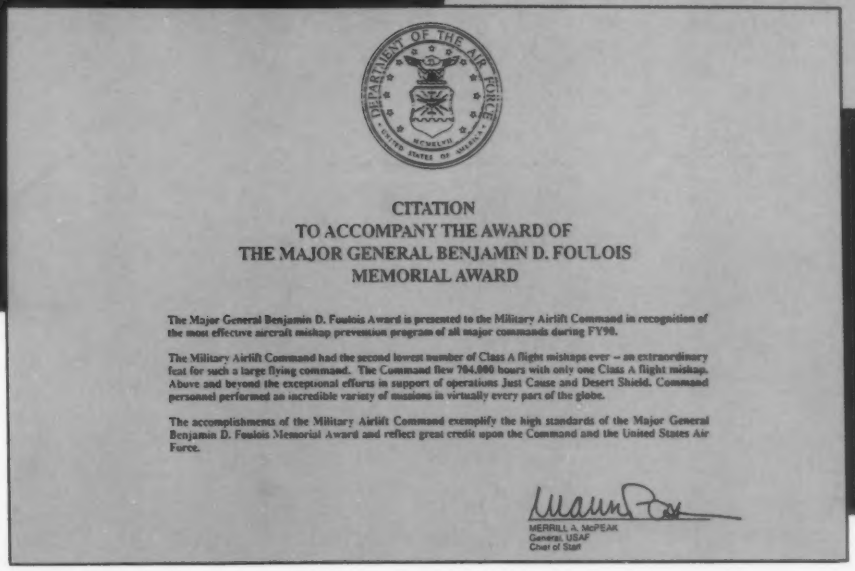


CITATION
TO ACCOMPANY THE AWARD OF
THE SECRETARY OF THE AIR FORCE
SAFETY AWARD

The Secretary of the Air Force Safety Award, Category I, for FY90 is presented to the Military Airlift Command for outstanding achievements in mishap prevention.

The Military Airlift Command Class A flight mishap rate is the second lowest rate in the Command's history. During the period of this award, 704,000 hours were flown while performing extraordinarily demanding missions. In ground safety, significant reductions have been made in both military injuries and fatalities. Continued emphasis on training has resulted in one of the lowest explosives mishap rates in the Command's history. The achievements of the Military Airlift Command exemplify the high standards established for the Secretary of the Air Force Safety Award and reflect great credit upon the Command and the United States Air Force.

DONALD B. RICE
Secretary of the Air Force



CITATION
TO ACCOMPANY THE AWARD OF
THE MAJOR GENERAL BENJAMIN D. FOULOIS
MEMORIAL AWARD

The Major General Benjamin D. Foulois Award is presented to the Military Airlift Command in recognition of the most effective aircraft mishap prevention program of all major commands during FY90.

The Military Airlift Command had the second lowest number of Class A flight mishaps ever -- an extraordinary feat for such a large flying command. The Command flew 704,000 hours with only one Class A flight mishap. Above and beyond the exceptional efforts in support of operations Just Cause and Desert Shield, Command personnel performed an incredible variety of missions in virtually every part of the globe.

The accomplishments of the Military Airlift Command exemplify the high standards of the Major General Benjamin D. Foulois Memorial Award and reflect great credit upon the Command and the United States Air Force.

MERRILL A. McPEAK
General, USAF
Chief of Staff

Command Wins Awards . . . page 31

TMF

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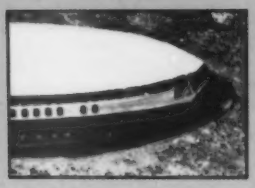

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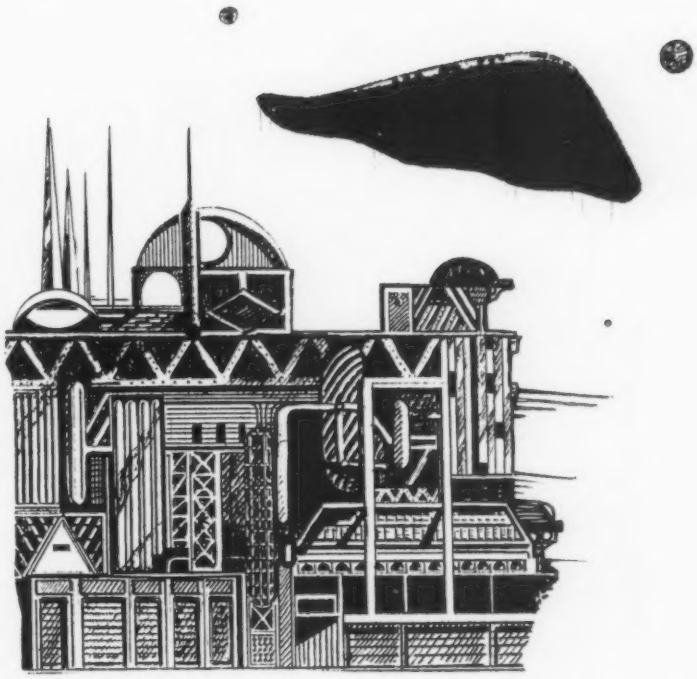
Coffee Goes Only So Far

By Capt. Philip A. Bossert, Jr.
438 MAW, McGuire AFB, N.J.



Retention was at an all-time low. The experience level of the fleet was dropping rapidly and this, coupled with the increasing demands of high technology equipment, was causing the accident rate to climb. These issues were heavy on the minds of not only policy-makers in the Pentagon and elsewhere, but also in the thoughts of the line pilots. Capt. Bob Hathaway was one pilot usually concerned with these issues, but he was more immediately concerned with the mission he was to shortly brief.

As he walked to the briefing room, Hathaway felt uneasy. For some reason, his gut feeling told him this was not going to be a typical mission. Maybe it was lack of sleep or the fact he hadn't flown in a month. He couldn't quite pinpoint the basis for it.

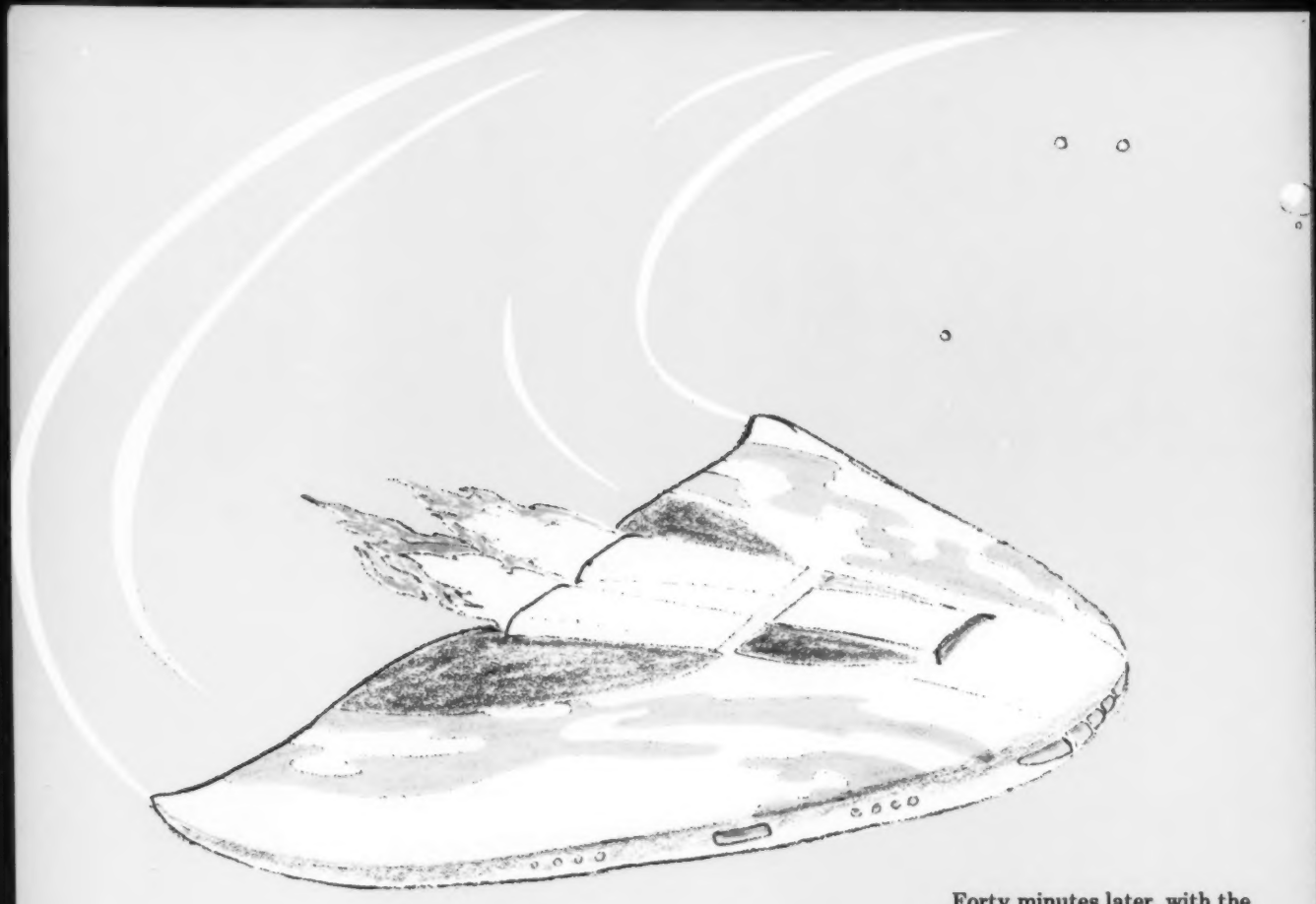
After Hathaway got to the briefing room, he picked up the mission folder and began leafing through it, being careful its contents didn't slip out and float around the cabin. The light from the portholes, with the blues and whites of the earth, illuminated the room. Even from 175 miles away, the view was spectacular, and Hathaway felt that no matter how routine this flying had become, the scenery never would get boring—ever.

The crew began filing in, and after hasty introductions, Hathaway began to brief. In a voice clearly indicating he was in command, he began.

"Good morning. I am Captain Hathaway, and I'll be the commander for this mission." For the next few minutes, he covered the required items and, when these were completed, added his personal comments.

"If anyone has any questions or sees anything they are not comfortable with, don't hesitate to

HONORABLE MENTION
1990 MAC FLIGHT SAFETY WRITING CONTEST



speak up. Safety and mission accomplishment go hand in hand, and there is no such thing as a stupid question."

After the briefing, Hathaway and his crew exited the briefing cabin and, as they began to gather their flying and TDY kits, the crew controller informed them their crew pod would be a few minutes late.

"Some things never change—including crew transport," Hathaway mentioned to his copilot, 1st. Lt. Kent Morgan.

Home station departures were usually the toughest portion of a mission, and today was no exception. This year, 2090, was the year U.S. Space Command had proclaimed as "The year of the support forces." Extra emphasis and recognition were given to thousands of dedicated personnel who kept hundreds of transports, research vessels, and defense ships launching around the clock through the solar system, yet home station departures were still a challenge.

"Maybe in another hundred years, they'll be on time," replied Morgan with a wry smile.

Forty minutes later, with the crew of six strapped into their stations aboard Super Nova, (an old but still reliable CT-469 Transport of the 20,000-ton class), Hathaway called for the "Starting engines checklist."

As the huge fusion engines rumbled to life, Super Nova shuddered slightly and, when the "Before rendezvous separation checklist" was completed, Hathaway gently maneuvered Super Nova 3,000 meters from orbital station 23, their home for the last day and a half. They couldn't launch directly from the station, because the fusion engines would tear the station apart.

The delicacy of the maneuvering hit Hathaway and he wished he had gotten more sleep. It was going to be a long day and a long, fatiguing ten-day mission. Even with all the high technology ad-

vancements making space flight so routine over the past sixty years, the basic aspects of safe flying— keeping current, staying in the books, getting plenty of varied experience, taking care of oneself, and not taking anything for granted, had not changed since the days of the Wright Brothers, and never would.

Unfortunately for Hathaway, he would learn some of these lessons again—the hard way—during this mission.

Fifteen minutes later, Super Nova was in the rendezvous separation envelope, and as the CRTs indicated all systems go, Hathaway asked Morgan to call departure control for clearance. Departure shot back:

"Cleared as filed to McGuire . . . maintain listening watch on 1446.9. . .squawk 020566.9. . . launch approved in two minutes at 1639.45. . . time on the hack 1637.45. . . five, four, three, two, one, hack."

As Morgan read the clearance back to the synthetic computer-generated voice, Hathaway felt a little drowsy. When he realized he was drifting off, he forced himself awake.

Exactly at 1639.45, Hathaway activated the fusion engines and their huge vessel began accelerating into the blackness of space. In a few minutes, orbital station 23 was just another star, and in about an hour, the earth wouldn't be much bigger.

As they reached coast-out velocity the reactors automatically shut down. The crew quickly completed the cruise checklists and began preparing for the four-day leg to their first destination, McGuire Space Port, a way station a few thousand clicks this side of the asteroid belt. They were scheduled for a 24-hour crew rest—plenty of time to do some shopping, sightseeing, and eat some famous "Asteroid chips and dip." But that was a long way off, and Hathaway was really beginning to feel tired.

"Hey Boss, you mind if I hit the bunk first?" asked Morgan.

Damn, thought Hathaway, I figured he was in better shape than I was. Fearing he would set a bad example for his young copilot and ignoring all he learned in Capsule Resource Management, a four-day simulator course he had completed a few months earlier, Hathaway said, "Go ahead, I'll wake you later. Just get me some coffee before you go."

His mistakes were beginning to multiply and he didn't even realize it. Like many accidents over the years, a series of mistakes compounding upon themselves, rather than one single oversight, cause a mishap. Hathaway was quickly heading down that path.

"Captain Hathaway, according to our Stellar Navigation System (SNS), we need to make our first mid-course correction in two hours, 41 minutes and 18 seconds at 0142.45," stated the engineer.

"Roger," replied Hathaway, who was now beginning to viciously fight off fatigue.

"Hey engineer, I'm feeling a little sleepy. Let's keep the conversation up so I'll stay awake."

"Sounds good to me, Boss."

Hathaway began the vain attempt at staying awake by talking not about systems, regulations, or any flying topics, but rather about the recent hiring by commercial carriers. Deregulation of the spaceways during the last decade and perfection of fusion engines had brought the furthest reaches of the solar system down from a year to just over a month. Demand for commercial space travel had exploded and there was now a shortage of pilots.

"Well, I just went under a year last week," replied Hathaway. "What do you think I should do, stay in or get out?"

"That's a very personal decision," replied his engineer. "One only you can make. But whatever you do, don't let peer pressure influence your decision. Space is not necessarily any less black on the other side."

As they talked into the stellar night, Hathaway began to drowse further. Unknown to Hathaway, his engineer was fading fast too. What didn't occur to them, because of their extreme fatigue, was that they were quickly approaching the time for their mid-course correction, a crucial maneuver they couldn't miss. But they kept fading and before they knew it, they were fast asleep . . . .

The ear-piercing siren and red rotating cabin lights shocked Hathaway and his crew back to reality as the automated voice of the master warning system emotionlessly stated: "Warning! Warning! Warning! Three minutes until mid-course correction. Incorrect waypoint programmed. Check SNS immediately. I repeat . . . . " And on and on it went.

"What the hell is happening?" shouted Hathaway as he tried to regain his senses.

In a semiconscious voice, the engineer shouted, "Sir, only two minutes, 30 seconds until our mid-course correction and a waypoint is apparently not programmed correctly."

"Damn it, wake the copilot," screamed Hathaway.

But Morgan was already in the crew capsule, searching frantically in the nav kit for an H-192, a stellar map for their route of flight. The correct waypoint would be on it.

"Bob, I can't seem to find the H-192," Morgan stated nervously.

"One minute, 32 seconds to go," shouted the engineer, who was now out of his station looking furiously through the cabin for the map.

Through all this confusion, the master warning system, with its ear-piercing siren and flashing red capsule light, continued unabated.

Hathaway was desperately looking around his station, and now, with only 45 seconds left, he discovered a map under his seat. Grabbing in and tearing it open, he shouted his discovery to the crew. Morgan jumped to the SNS and began looking for the mispro-

Capt. Bossert, a 1982 AF Academy graduated, earned his wings at Reese AFB, TX. He has over 3,300 flying hour in the CT-39B, C-21A, and C-141B. This is Captain Bossert's third winning entry in the 1990 Writing Contest.

grammed waypoint.

The tension was almost unbearable. If they didn't correct their mistake in the next 45 seconds, the fusion engines would ignite anyway, sending them on a course somewhere else in the solar system. Out here, when you made a navigational error, you just didn't do a "U" turn and try again. Due to the tremendous distances and speeds, one mistake could be fatal.

Hathaway could see it now—he and his crew, out of fuel and oxygen, discovered by a rescue/recovery ship months or years from now, their bodies perfectly preserved in the -450 Centigrade temperatures. What a way to go!

"I found it," screamed Morgan.

"Fourteen seconds until midcourse correction," said the engineer.

"Incorrect waypoint," continued the warning system.

"Here's the correct one," yelled Hathaway with the map shaking in his hand. The engineer just looked on, frozen with terror.

"45 degrees, 32 10; 89 degrees, 41 81; 115 degrees, 12 58." Hathaway spoke carefully.

Knowing he had only one chance, Morgan nervously but meticulously entered each number, then "waypoint changed" it.

". . . four, three, two, one," droned the intercom.

As the fusion engines fired to life, the entire ship rumbled. The acceleration threw Hathaway and Morgan into their seats and the engineer into the rear bulkhead.

They froze during the 20-second maneuver. Fear and tension remained since they didn't have time to double check their correction. The only thing they could do now, besides worry, was pray, and Hathaway knew for certain that at least one of them was doing that right now.

Finally, as quickly as they started, the huge engines automatically shut down. A deathly silence inundated the crew capsule with the warning system finally off and the crew silent.

Instinctively, Morgan checked on the engineer, who was apparently okay except for a few bruises. Hathaway apprehensively looked at the SNS and began checking the coordinates.

"Well, Bob, what's the verdict?" asked Morgan, still shaking from tension.

The fatigued smile on Hathaway's face said it all, and the flight path on the center CRT, which ended as "SWRI," the stellar symbol for McGuire Space Port, confirmed they were saved.

Thirty minutes later they were all back in their seats and, with things somewhat back to normal, Morgan said humbly, "Hey Bob, I want to apologize for inputting the incorrect point."

"Don't sweat it. I think we all learned something," replied Hathaway. "I should have caught it anyway."

"By the way, Kent, you mind if I get some sleep?" asked Hathaway reluctantly.

"Not at all, Boss. Go ahead."

As Hathaway unstrapped and floated out of his seat, he looked at Morgan and, with a big smile added,

"By the way, I triple-checked the remaining waypoints."

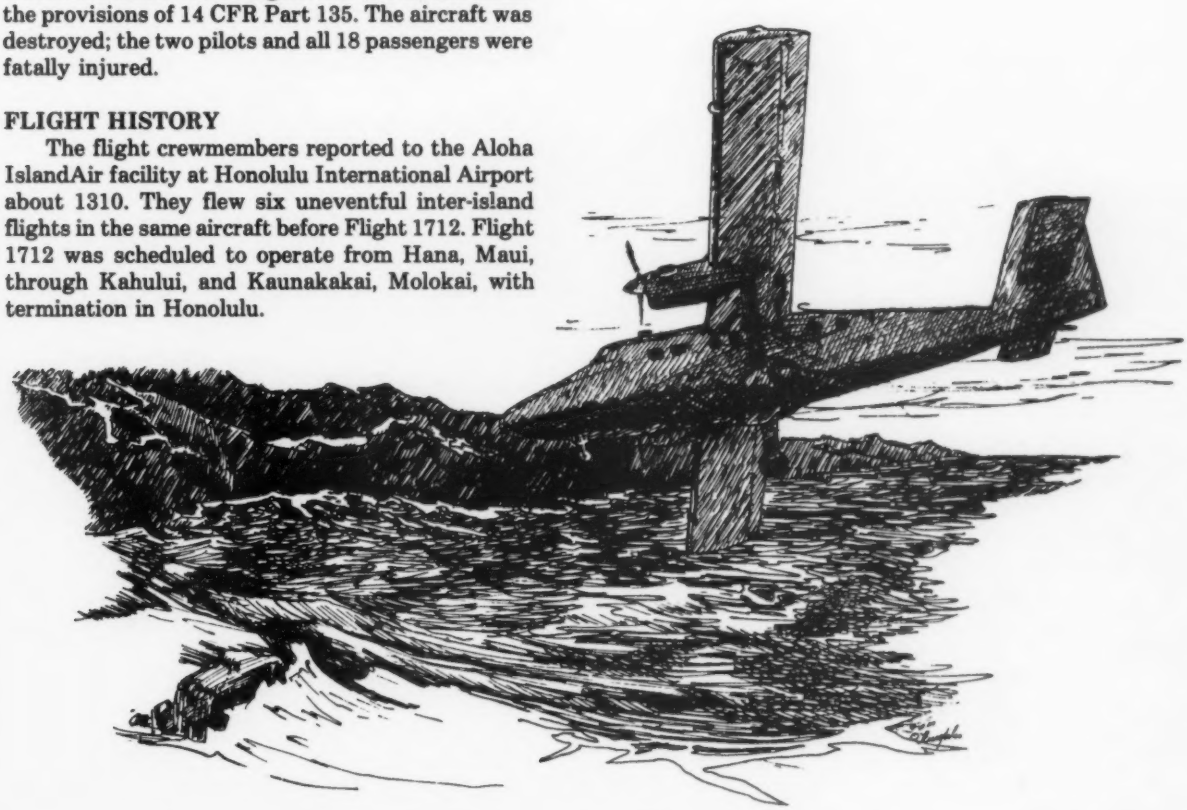
Descent into Darkness

The VFR Hazard

On 28 Oct 1989, Aloha IslandAir Flight 1712, a de Havilland DHC-6-300, Twin Otter, N707PV, collided with terrain near Halawa Bay, Molokai, Hawaii, en route on a scheduled passenger flight from Kahului Airport, Molokai, Hawaii. The flight was conducted under visual flight rules (VFR) and under the provisions of 14 CFR Part 135. The aircraft was destroyed; the two pilots and all 18 passengers were fatally injured.

FLIGHT HISTORY

The flight crewmembers reported to the Aloha IslandAir facility at Honolulu International Airport about 1310. They flew six uneventful inter-island flights in the same aircraft before Flight 1712. Flight 1712 was scheduled to operate from Hana, Maui, through Kahului, and Kaunakakai, Molokai, with termination in Honolulu.



At 1815, Flight 1712 arrived as scheduled at Kahului. At 1815:44, during taxi to the ramp area, the flight crew requested departure clearance from the Kahului Airport Radar Service Area (ARSA) in preparation for the next leg to Kaunakakai.

Official sunset occurred about 1753, while the aircraft was at Kahului. No problems or unusual circumstances were reported by the crew or noted by ground personnel during this intermediate stop. The First Officer remarked he thought the intended route between Maui and Molokai looked quite dark.

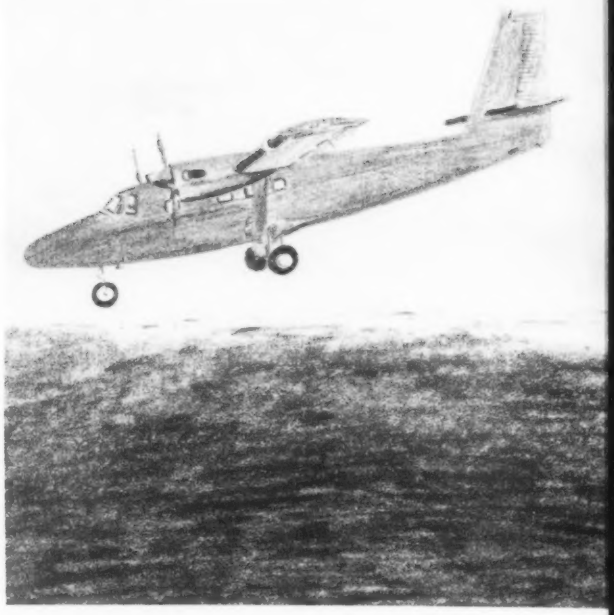
At 1825, after about ten minutes on the ground, Flight 1712 departed Kahului on a VFR flight plan and was scheduled to arrive at Kaunakakai at 1850. The departure clearance specified a heading of 320-degrees and an altitude of 1,000 feet MSL. Company personnel who listened to the ATC tapes identified the voice making the radio transmissions as the First Officer. This identification implied the Captain was flying the aircraft.

At 1826:52, the pilot radioed he was airborne and climbing through 400 feet for a cruise altitude of 1,000 feet. At 1827:15, departure control advised, "Radar contact, resume own navigation." At 1827:27, Flight 1712 leveled off. Radar data indicated that approximately three minutes later, it began to descend out of 1,000 feet at a rate of about 250 feet per minute. The airplane leveled off at 500 feet at 1832:34. At 1833:13, the mishap aircraft was about 16 miles northwest of the Kahului Airport and clear of the ARSA. Departure control informed it that radar contact was lost and to squawk transponder code "1200." The flight crew acknowledged the transmission. This was the last known transmission from Flight 1712.

Radar data showed the flight operated at a ground speed of approximately 140 knots during its climb. After reaching 1,000 feet, ground speed increased to about 165 knots. At 1832:39, after the flight leveled at 500 feet, ground speed decreased to approximately 150 knots. This speed remained nearly constant until contact was lost with the target.

Radar data revealed Flight 1712's track progressed on a heading of about 320-degrees to a point about two miles east of the island of Molokai, where it turned to a heading of about 260-degrees. The flight remained at 500 feet until contact was lost with the target at 1836:36.

There were no eyewitnesses to the crash. The flight was declared missing about 1930 and an immediate search and rescue effort commenced. The wreckage was found the next morning on the northeastern slope of the coastal mountains on the island of Molokai at around 600 feet. The accident occurred about 1837, during darkness.



ANALYSIS

Investigation revealed the airplane had been maintained in accordance with applicable FARs and company operation specifications. The Captain was properly certified and qualified in accordance with applicable FARs and company requirements. Both flight crewmembers were in good health and had proper medical certification at the time of the mishap.

The investigation determined there was an orographic cloud over the northeastern end of Molokai, created by the northeast trade winds. An orographic cloud is developed when air is forced aloft by rising terrain and cooled to saturation. The cloud is constantly being generated on the upwind slope of the terrain and dissipated on the downwind slope, making it appear stationary. Based on witness observations and analysis of meteorological conditions, the base of the cloud was about 500 feet above sea level and the top was about 4,500 feet. Orographic clouds are common in Hawaii and other mountainous tropical islands in the trade wind belt. The Captain's previous experience in the Hawaiian Islands should have made him familiar with, and aware of, the possibility of orographic clouds in this mountainous area. The Safety Board concluded that at the time of the accident it was too dark to avoid the clouds by visual reference and therefore it was unsafe to continue VFR flight near Halawa Point. The Safety Board further concluded the flight entered clouds and continued into high terrain.

The 500-foot ceiling over the eastern (windward) end of Molokai was considerably lower than the

2,000-foot ceiling predicted by the Area Forecast, and IMC conditions existed in this region below 4,500 feet. Consequently, the Safety Board concluded the weather forecast valid at the time of the accident was incomplete because it did not include the possibility of low cloud conditions along the intended route of flight. Had the forecast been accurate, the Captain could have been informed of the likelihood of orographic clouds and might have filed an IFR flight plan or altered his course; therefore, the Safety Board concluded that National Weather Service reports should include the possibility of orographic clouds whenever conditions exist that could create such clouds.

Shortly after leaving the Kahului ARSA, Flight 1712 descended to 500 feet, an altitude that did not comply with 14 CFR Part 135 or with Aloha IslandAir's operating procedures for night operations. Based on flight track, the Board concluded that in reduced visibility conditions of darkness, low clouds, and precipitation, and with the lack of lighted visual reference points on the ground, the Captain visually mistook the surf breaking on Cape Halawa for the portion of land known as Lamaloa Head. This error caused the aircrew to enter the north side of the Halawa Valley at an altitude substantially lower than the height of the terrain. The Safety Board believed that, rather than trying to continue the VFR flight at 500 feet above the water, the prudent action would have been for the Captain to file IFR en route.

The Safety Board's examination of the Captain's background established a pattern of unprofessional behavior. Similar behavior continued following the Captain's employment by Aloha IslandAir. Two previous employers reported the Captain had developed careless and unsafe practices as a result of his attitude and off-duty activities. The Captain, while a First Officer, had been reprimanded by a senior Aloha IslandAir captain for falling asleep in flight after reporting for duty in a fatigued condition and by another Aloha IslandAir captain for exercising poor judgment. Evidence indicates the Captain's behavioral traits adversely influenced his professional judgment on the day of the mishap and contributed to his decision to continue the planned VFR flight into IMC. The Board cannot conclude with certainty that chronic fatigue adversely affected the Captain's conduct that day. However, his activities in the days and weeks prior to the accident probably were detrimental to performance and were probably factors affecting his judgment and ability to make appropriate decisions. The investigation revealed that Aloha IslandAir was unaware that the Captain's behavior was similar to that observed by two previous employers. The Captain was originally hired as a ramp agent by Princeville Airways. Copies of his application for employment and background check could not be found in the company's files. Aloha IslandAir had not conducted a preemployment background check on the captain before hiring him as a First Officer since he had previously worked for the company as a ramp agent. Moreover, Aloha IslandAir had not examined the Captain's safety record by using the FAA's accident/incident files and enforcement history records. Had Aloha IslandAir done so, it might have been able to identify and correct a pattern of inappropriate behavior before upgrading him or it might have decided against upgrading him completely.

The Safety Board believed there were subtle factors that may have contributed to the Captain's decision to continue the flight under the clouds at 500 feet, contrary to company and FAA requirements. He may have been trying to maintain the flight schedule by remaining VFR and following the northern Molokai coastline, and to provide the passengers with a relatively smooth ride. He may have been fatigued and may have wanted to end the trip as quickly and easily as possible. Another possible explanation is that the Captain did not want to complicate or otherwise increase his work load by filing an IFR flight plan en route.

PROBABLE CAUSE

The National Transportation Safety Board determined the probable cause of this mishap was the airplane's controlled flight into terrain as a result of the Captain's decision to continue flight under VFR, at night, into instrument meteorological conditions, which obscured rising mountainous terrain.

Contributing to the accident was the inadequate supervision of personnel, training, and operations by Aloha IslandAir management, and insufficient oversight of Aloha IslandAir by the Federal Aviation Administration, particularly during a period of rapid operational expansion.

APPLICATION TO MAC

The applications of this mishap to the way we do business are evident. When flying VFR, the temptation is sometimes there to press the weather to complete the mission. There is sometimes a grey area when we're not quite sure whether or not we can continue VFR. Integrity and professionalism, however, are vital aspects of the flying business. There is no room for shortcuts. When in doubt, follow established guidelines— alter the route of flight to stay VFR, or get an IFR clearance.

Adapted from *NTSB/AAR-90/05*

Thunderstorm

The All-Time Hatcher of Hazards

We all know what a thunderstorm looks like. Books are filled with the mechanics and life cycles of these atmospheric monstrosities. Yet, research continues to expand our understanding. No matter how much our knowledge expands, there is one rule that will never change—all thunderstorms should be considered hazardous. Almost any thunderstorm can spell disaster for the aircraft or pilot that strays too close to it.

A thunderstorm packs just about every weather hazard known to aviators, in one vicious bundle. Additionally, hazards can occur in numerous combinations. Let's take a look at the squall line, then examine the hazards individually.

Squall Lines

A squall line is a narrow band of active thunderstorms. Usually, it develops on or ahead of a cold front, in moist, unstable air, but it may develop in unstable air far removed from any front. The line may be too long to detour around easily, and too wide or severe to penetrate. It often contains thunderstorms in various stages of development and presents the single most intense weather hazard to aircraft. It usually forms rapidly, generally reaching maximum intensity during late afternoon and the first hours of darkness.

Tornados

During the growth stage, thunderstorms draw air into their cloud bases with great vigor. If the incoming air has any initial rotating motion, it often forms an extremely concentrated vortex from the surface well into the cloud. Meteorologists estimate wind in such vortices can exceed 300 knots; pressure inside the vortex is explosively low. The strong winds gather dust and debris and the low pressure generates a funnel-shaped cloud extending downward from the cumulonimbus base. It's called a "funnel cloud" if it doesn't reach the surface, a "tornado" if it touches down over land, or "waterspout" if it touches down over water.

Tornadoes can occur with both isolated and squall line thunderstorms. The violent up and down drafts associated with convective weather always mean violent turbulence. Families of tornadoes have been observed as appendages of the main cloud, extending several miles outward from a massive thunderstorm cell. Since the vortex extends well into the cloud, any aircraft caught in a severe thunderstorm could run into a hidden vortex and probably not come out in one piece.

Turbulence

Hazardous turbulence is present in all thunderstorms, and a severe thunderstorm can destroy an aircraft. Strongest turbulence within the cloud occurs with shear between updrafts and downdrafts. Outside the cloud, shear turbulence has been encountered several thousand feet above and 20 miles laterally from a severe storm. The shear zone associated with the gust front is a low-level turbulent area. Often, a "roll cloud" on the leading edge of a storm marks the top of eddies in this shear and signifies an ex-

tremely turbulent zone. Gust fronts often move far ahead (up to 15 miles) of the associated precipitation. A strong gust front causes a rapid and sometimes drastic change in surface wind speed and direction ahead of an approaching storm. Fig. 1 shows a cross section of a thunderstorm with areas outside the cloud where turbulence may be encountered.

Getting caught in a thunderstorm is no picnic. Turbulence makes it almost impossible to hold a constant altitude, and maneuvering in an attempt to do so will only increase stresses on the aircraft, possibly to the breaking point. Reducing to recommended turbulence penetration airspeed and letting the aircraft "ride the waves" by holding a constant attitude, is about the only way to minimize the effects of turbulence. There's no sure way to pick "soft spots" in a thunderstorm. The surest method of survival is simply to *stay away.*

Icing

Thunderstorm icing can be extremely hazardous. Updrafts in a thunderstorm support abundant liquid moisture with relatively large droplet sizes that, when carried above the freezing level, become supercooled. When the temperature in an upward current cools to about -15-degrees C, much of the remaining water vapor sublimates as ice crystals; and above this level, at lower temperatures, the amount of supercooled water decreases.

This supercooled water freezes on impact with an aircraft. Clear icing can occur at any altitude above the freezing level; but at high levels, icing from smaller droplets may be rime or mixed rime and clear. The abundance of large, supercooled water droplets makes clear icing form very rapidly between 0-degrees and -15-degrees C and encounters can be frequent in a cluster of cells.

Hail

But don't worry too much about icing, the hail will knock it off! Hail competes with turbulence as the greatest thunderstorm hazard to aircraft. Supercooled drops above the freezing level begin to freeze. Once a drop has frozen, and other drops latch on, the frozen mass begins to fall. Caught in another updraft, up it goes again, gathering more ice. This up and down race track continues until the hailstone is heavy enough to fall to the ground. Large hail occurs in severe thunderstorms with strong updrafts that have built to great heights. Hailstones can fall some distance from the storm core. Hail can be thrown from the top of a thunderstorm and therefore may be encountered in clear air several miles from dark thunderstorm clouds.

As hailstones fall through air with a temperature above freezing, they begin to melt and precipitation may reach the ground as either hail or rain. Rain at the surface does not mean the absence of hail aloft. Hail could accompany any thunderstorm, especially beneath the anvil of a large one. Even small hailstones can ruin your whole day (and your airplane).

Low Ceiling and Visibility

Precipitation can seriously restrict visibility and lower the ceiling between the cloud base and the ground. These restrictions create the same problem as all ceiling and visibility restrictions, but the hazards are increased when associated with the other thunderstorm hazards of turbulence, hail, and lightning, and make precision instrument flying virtually impossible.

Effects on Altimeters

Pressure usually falls rapidly with the approach of a thunderstorm, then rises sharply with the onset of the first gust and arrival of the cold downdraft and heavy rainshowers, falling back to normal as the storm moves on. This cycle of pressure change may occur in 15 minutes. If the pilot doesn't receive a corrected altimeter setting, the altimeter may be more than 100 feet in error.

Lightning

A lightning strike can puncture the skin of an aircraft and damage communications and electronic navigation equipment. Lightning has been suspected of igniting fuel vapors causing explosions; however, serious accidents due to lightning strikes are rare. Nearby lightning can blind the pilot, rendering him momentarily unable to navigate either by instruments or visual reference. Lightning discharges, even distant ones, can disrupt radio communications on low and medium frequencies. Lightning generally occurs within plus or minus 8-degrees of the freezing level in clouds and in precipitation. Severe storms have a high frequency of lightning.

Engine Water Ingestion

Turbine engines have a limit on the amount of water they can ingest. Updrafts are present in most thunderstorms, particularly those in the developing stages. If the updraft velocity in the thunderstorm approaches or exceeds the terminal velocity of falling raindrops, very high concentrations of water may occur. These concentrations can be more than the quantity of water engines are designed to ingest. Therefore, severe thunderstorms may contain areas of high water concentrations which could result in flameout or structural failure of one or more engines.

There's no known procedure

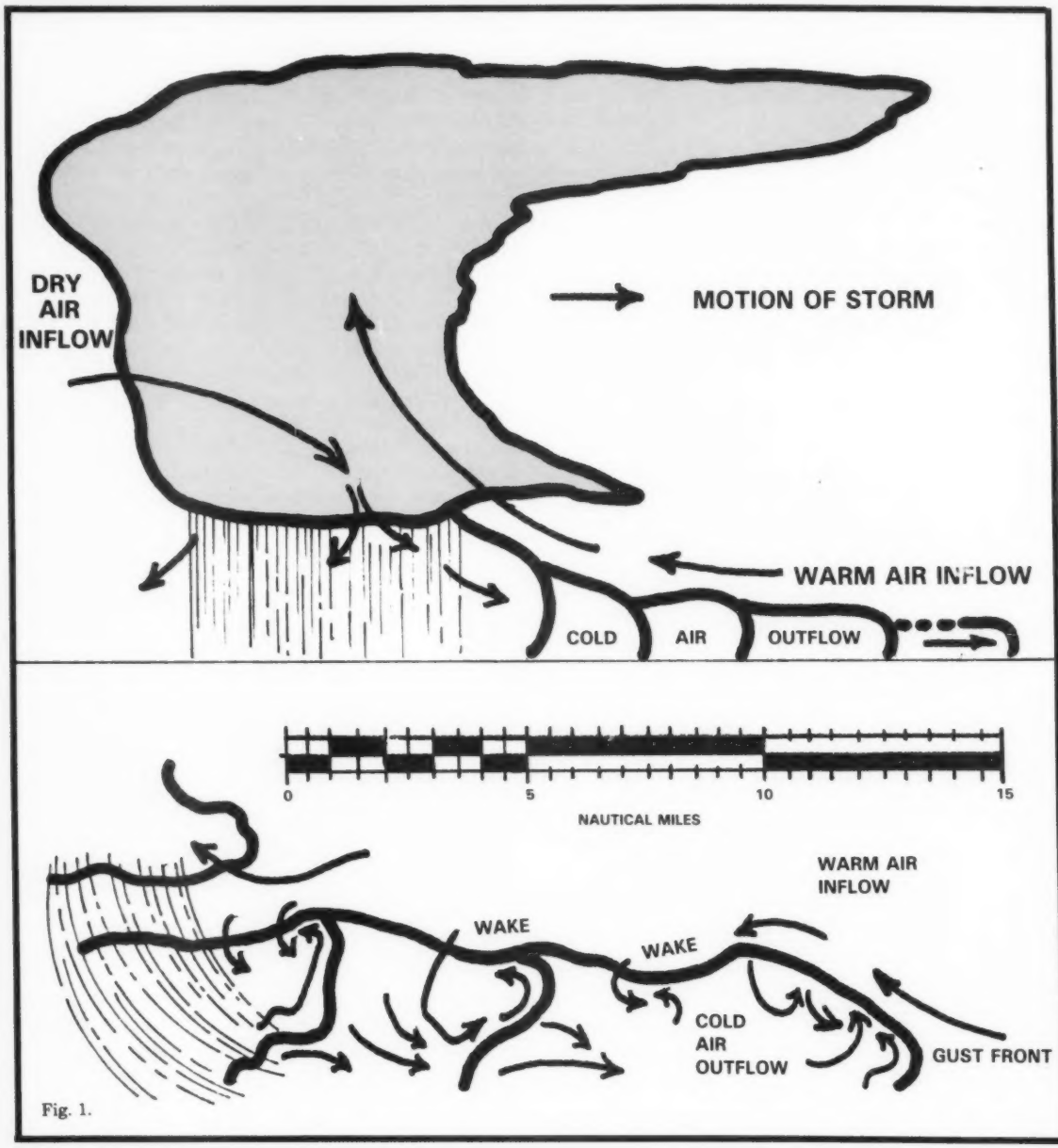

DRY
AIR
INFLOW
MOTION OF STORM
WARM AIR INFLOW
COLD
AIR
OUTFLOW
0
5
10
15
NAUTICAL MILES
WARM AIR
INFLOW
WAKE
WAKE
COLD
AIR
OUTFLOW
GUST FRONT

Fig. 1.

that can completely eliminate engine damage or flameouts during massive water ingestion. Although the exact mechanism of water-induced stalls hasn't been determined, thrust changes may have an adverse effect on engine stall margins in the presence of massive water ingestion.

Avoiding severe storm systems is the only known effective way to prevent exposure to multiple engine damage or flameouts. If all else fails and you end up in these conditions, follow turbulence penetration procedures in your flight manual and especially avoid thrust changes unless airspeed is varying drastically.

Weather Radar

While not a hazard in itself, ground or airborne radar can lead you into a false sense of security. Remember, both have their limitations. Thunderstorms build and dissipate rapidly. Therefore, don't attempt to plan a course between echoes. The best use of ground radar information is to isolate general areas and coverage of echoes. Avoid individual storms by visual sighting or by airborne radar. It's better to avoid the whole thunderstorm area than to detour around individual storms, unless they're scattered.

Airborne weather avoidance radar is, as the name implies, for avoiding severe weather—not penetrating it. Whether to fly into an area of radar echoes depends on echo intensity, spacing between echoes, and the capabilities of you and your aircraft. Weather radar detects only precipitation; it does not detect turbulence. Therefore, the radar scope provides no assurance of avoiding turbulence. Your scope may be clear between intense echoes; this clear area does not necessarily mean you can fly between storms and maintain visual separation from them.

Avoid intense or extreme echoes by at least 20 miles; that is, such echoes should be separated by at least 40 miles before you fly between them.

DO'S AND DON'TS OF THUNDERSTORM FLYING

Above all, remember: Never regard any thunderstorm lightly, even when radar observers report echoes are of light intensity. Avoiding thunderstorms is the best policy. The following are some "do's" and "don'ts" of thunderstorm avoidance.

- Don't land or take off in the face of an approaching thunderstorm. A sudden gust front or downburst can cause low level turbulence or a shear zone which could cause loss of control.

- Don't attempt to fly under a thunderstorm, even if you can see through to the other side. Turbulence and wind shear under the storm could be disastrous.

- Don't fly without airborne radar into a cloud mass containing scattered embedded thunderstorms. Scattered thunderstorms, not embedded, usually can be visually circumnavigated.

- Don't trust visual appearance as a reliable indicator of turbulence inside a thunderstorm, or as an indicator of storm severity.

- Do avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo. This is especially true under the anvil of a large cumulonimbus.

- Do circumnavigate the entire area if the area has 6/10 thunderstorm coverage.

- Do remember vivid and frequent lightning indicates the probability of a severe thunderstorm.

- Do regard as extremely hazardous any thunderstorm with tops at 35,000 feet or higher whether the top is visually sighted or determined by radar. In Alaska or Europe, severe thunderstorms can occur with tops below 20,000 feet.

If you cannot avoid penetrating a thunderstorm, here are some "do's" to consider BEFORE entering the storm:

- Tighten your safety belt and secure all loose objects.

- Plan and hold your course to take you through the storm in minimum time.

- Establish a penetration altitude above the freezing level or below the -15-degree C level to avoid the most critical icing.

- Verify pitot heat, wing and empennage, and engine anti-ice are on. Icing can be very rapid at any altitude and cause almost instantaneous power failure and loss of airspeed indications.

- Establish power settings for turbulence penetration airspeed recommended in your Dash One.

- Turn up cockpit lights to highest intensity to lessen temporary blindness from lightning.

- Disengage the altitude hold and speed hold modes of the autopilot if they're on. Letting the aircraft "ride the waves" will reduce airframe stress.

- If using airborne radar, tilt the antenna up and down occasionally. This permits you to detect other thunderstorm activity at altitudes other than your own.

During thunderstorm penetration:

- Do keep your eyes on your instruments. Looking outside the cockpit increases danger of temporary blindness from lightning.

- Don't change power settings; maintain settings for recommended turbulence penetration airspeed.

- Don't turn back once you are in the thunderstorm. A straight course through the storm will most likely get you out most quickly. In addition, turning maneuvers increase stress on the aircraft.

Y'all have a nice summer

Excellence in Airmanship

Lt. Col. William E. Garrett and Crew, 167th Tactical Airlift Group, W.Va, were involved in a serious flight emergency, 1 Aug 90 while returning their C-130 to home station following Programmed Depot Maintenance. (As you review the sequence of events, bear in mind the total elapsed time of this mishap from initial explosion to evacuation of the aircraft was approximately *six* minutes.) On takeoff, just after rotation, the crew heard and felt an explosion and the pilot began to feel excessive vibration in the number three throttle. All cockpit indications were normal and the aircraft commander directed a scan of the right wing. The loadmaster reported a clean scan but heard a noise coming from high in the right wheel well. Although he reported the noise, the pilot didn't hear the response due to a partial interphone failure.

The engineer felt vibrations in the throttle and condition lever, and discovered the number four throttle and condition lever were also vibrating. The pilot leveled the aircraft at 1,000 feet AGL and the copilot notified departure control.

The engineer then noticed numbers three and four generator-out lights illuminated. The generators were checked and turned off in accordance with flight manual procedures. Next, the right wheel well overheat light came on, followed by the center wing and right outer wing overheat warning lights. The right inboard and outboard temperature gauges read in the over-temperature range. The engineer, having no intercom with the pilot, initiated action to close numbers three and four engine bleed air valves and the right wing isolation valve, and also to isolate the left wing.

The pilot realized his interphone had failed and was not aware of all the problems or actions taken. Because of the engineer's actions, he decided to get the aircraft back on the ground as quickly as possible. He turned downwind and directed the copilot to declare an emergency. The pilot and engineer determined they had a bleed air leak and decided to disregard a prop low oil light on number four engine. The loadmaster reported the right wheel well was extremely hot and smoke was beginning to fill the cargo compartment. This report was heard only by the engineer.

The pilot, realizing the engineer had the best picture of what was wrong, asked him, over cockpit noise, if he felt any engines should be shut down. He received a negative response, and the pilot concentrated on flying the aircraft while the copilot coordinated with Departure Control for crash vehicle response and return to the field.

The master fire warning light then came on with the number three fire handle indicating a turbine overheat. The crew ignored this indication since they were about to land. Shortly thereafter, the number four nacelle overheat warning light illuminated and the engineer noticed numerous circuit breakers associated with numbers three and four engines, popped.

Since no action had been taken on the "After Takeoff Checklist," the pilot directed 100 percent flaps and made an emergency landing on the departure runway. The pilot brought the aircraft to a stop on the runway and the crew emergency evacuated.

Inspection revealed a 12-to 15-inch section of bleed air duct had failed approximately 18 inches inboard of number three engine cowling. The failure allowed 600–700-degree Celsius air at approximately 100 psi to enter the leading edge.

Lieutenant Colonel William E. Garrett and crew did an outstanding job handling this situation. The numerous false indications caused by burning wires could have encouraged a less skilled and alert crew to enter a two-engine situation at a very critical phase of flight. All crewmembers acted as a professional team in this very high stress situation. Their actions reduced the damage caused by this bleed air leak and subsequent fire and saved a very professional crew and valuable aircraft. They are most deserving of the MAC Excellence in Airmanship Award. Congratulations from *TMF*.

Flying-Hour Milestones

10,000

167 TAG
SMSgt. Richard L. Zirk

337 MAS
CMSgt. Fredrick Allard
MSgt. Thomas C. Durkin

433 MAW
MSgt. Robert Escamilla, Jr.

701 MAS
CMSgt. James A. Edwards

7,500

HQ MAC/XOTV
CMSgt. Blaine R. Means

50 TAS
SMSgt. Francis L. Brown

62 TAS
MSgt. John A. Rawlings

118 TAW
Col. Russell T. Birmingham, Jr.

145 TAG
SMSgt. Frank M. Robinson

167 TAG
MSgt. Howard L. Williams, Jr.

335 MAS
MSgt. John Fiordaliso

337 MAS
Col. Fredrick W. Lindahl
SMSgt. William E. Mahoney

709 MAS
Lt. Col. Francis P. Gallagher
MSgt. Jessie J. Fisher

5,000

73 AES
SSgt. Harold E. Krohne

118 TAW
Maj. William H. Weathers
SMSgt. James A. Buckner, Jr.
MSgt. Jerry W. Lewis
MSgt. Michael E. Beamer
TSgt. William H. Warburton, II.

145 TAG
Maj. Thomas W. Bush
TSgt. Andrew M. Huneycutt

167 TAG
Lt. Col. Charles J. Enders, III.
Maj. Anthony E. Lorber
MSgt. William L. Scott

185 TAS
Maj. James A. Craig
Maj. Michael F. Fouts

337 MAS
Lt. Col. Peter C. Eiche
Lt. Col. Bernard J. Ferro
Lt. Col. Nelson H. Newhouse
Maj. Glen F. Deforge
SMSgt. Kenneth J. Gilbert

701 MAS
Maj. Donald E. Combee, Jr.
Maj. William J. Travis
CMSgt. Robert S. Brock
MSgt. Darrell L. Wyrick
TSgt. Candace L. Taylor
SSgt. Louis C. Marino

709 MAS
Maj. Gerald D. Alborn
Maj. Robert A. Bell, Jr.
Maj. Lowell W. Crane, Jr.
MSgt. Syndey Redmond

756 MAS
Lt. Col. Daniel C. Beaudette
Lt. Col. Daniel L. Boesz
Lt. Col. Bruce E. Happe
Lt. Col. Thomas P. Loftus
Lt. Col. Gary P. Martindell
Lt. Col. Raymond Stricklen
Maj. John Czabaranek
Maj. Robert L. Glendening
Maj. Stephen J. Hanlon
Maj. John M. Kuchta
Capt. Thomas D. Cechettini
MSgt. Paul R. Oliver
MSgt. Willie Swinson

2,500

6 MAS
SSgt. Anthony DeSilva

56 MAS
MSgt. Joseph S. Wisneski, Jr.
TSgt. Craig S. Harvey
TSgt. Henry E. Tibbs

57 MAS
Capt. David V. Klasek
Capt. David A. Locke
SSgt. Ronald N. Marshall
SSgt. Bruce A. Mount
SSgt. Alfred G. Taus

118 TAW
Lt. Col. Gary C. Winn
Maj. Randall K. Jones
Capt. Michael F. Brown
Capt. Donald F. Knox
Capt. James A. Medd
Capt. William B. Walkup
TSgt. Charles D. Brooks, Jr.
TSgt. Frederick R. Neff
TSgt. Lewis B. Powell, Jr.

143 TAS
1st. Lt. Anthony M. Lancia
MSgt. David B. Vaughn
SSgt. David O. Huffman

145 TAG
TSgt. Johnny A. Sarratt

167 TAG
Capt. Ronald D. Barton
Capt. Douglas D. Jocz
Capt. Larry K. Rhodes
Capt. Stephen J. Robison
MSgt. James B. Bachtell
TSgt. Douglas G. Hilliard

185 TAS
Maj. Joseph D. Zylwitis
Capt. Coy L. Miller
TSgt. Steven E. Martin
TSgt. Andre B. Snodgrass
SSgt. Ronald D. Dorough

326 MAS
MSgt. Arthur J. McGee

337 MAS
Maj. James R. Hosey
Capt. Matthew A. Gailing
Capt. Clyde L. Pritchard
TSgt. John A. Evelyn
TSgt. Michael J. Marrone

701 MAS
Capt. Kris Deicet
Capt. Kevin M. Hayes
Capt. James M. Phillips
Capt. William F. Simons, III.
MSgt. Michael E. Hawkins
MSgt. Kenneth J. Mills
MSgt. Jack Webster, Jr.
TSgt. Michael C. Kalbfleisch
TSgt. Gary L. Winter
SSgt. Mark L. Coleman

Ranks and units are those at time of award.

TEAMWORK AT 37,000 FEET

Loss of all hydraulics just wasn't supposed to happen.

On 19 July 1989, at 1516, a DC-10-10 operated by United Airlines as Flight 232, experienced a catastrophic failure of the number two, tail-mounted engine, during cruise flight. Separation, fragmentation, and forceful discharge of first stage fan rotor assembly led to loss of three hydraulic systems that power the airplane's flight controls. The flightcrew experienced severe difficulties controlling the airplane, which subsequently crashed during an attempted landing at Sioux Gateway Airport, Sioux City, Iowa. There were 285 passengers and 11 crewmembers on board.

The National Transportation Safety Board determined the probable cause was inadequate consideration given to human factor limitations in the inspection and quality control procedures used by United Airline's engine overhaul facility. This resulted in failure to detect a fatigue crack originating from a previously undetected metallurgical defect in a critical area of the fan disk. Catastrophic disintegration of the disk resulted in debris thrown with sufficient force to exceed protection provided by the design features of the hydraulic system.

Of the 296 people on board the jumbo jet, 112 lost their lives. Two-thirds, however, survived—some with only scratches and bruises. Their survival is the success story of Flight 232.

Captain Al Haynes, pilot of Flight 232, agreed to answer questions concerning the reasons for this success. He pointed to United Airline's team training program—a program which convinced him of the value of team training for pilots.

How certain are you that, without team training, more lives would have been lost aboard Flight 232?

You never know exactly what it would have been like without team training. I'm thoroughly convinced, however, that it worked for us. We worked together as a team, listening to one another and relying on each other's experience and training.

What does United Airline's team training program involve?

We call our training CLR. That stands for Command/Leadership/Resource Management. The basic goal is to get everyone to work together as a team. I learned a new word during training—synergism. I remember asking, "What does synergism mean?" I also remember the response: "One plus one plus one equals four."

Synergism allows a crew to gain the maximum benefit from each crewmember. The result is that the sum of the total effort is greater than the sum of the individual efforts.

To practice synergism, we used the flight simulator. We were assigned certain roles in problem situations. We would either act as Captain, Second Officer, or Flight Engineer.

I recall my role during one of those simulated flights. I acted the part of a copilot who is concerned, and rightly so, with the safety of a takeoff. We were sitting on the runway and I told the Captain it wasn't safe. The Captain said, "Well, we're going to go anyway. What are you going to do about that?"

First, I tried to reason with him. The idea was to resolve the situation to everyone's satisfaction and, in doing so, remain calm and collected. But when the Captain persisted, I stood on the brakes.

The company wants to know how you're going to react. One of United's concerns is that all members of the flight crew have input into flight decisions. No one should be intimidated by the Captain to the degree their valuable experience or training isn't used.

Every year we return to Denver for more team training in United's flight simulator.

Why did United Airlines develop its CLR program?

There used to be a mindset that the Captain could choose to make all the decisions on his own. The copilot and flight engineer would avoid contradicting the Captain. Most would step in, of course, if safety was a factor, but some wouldn't. They were intimidated.

That's nonsense. The Captain is human, just like everyone else, and he can make mistakes. He just happens to be in the left seat. The Captain is the ultimate authority, but he can use the training, experience, and knowledge of the rest of his crew to everyone's advantage.

When United Airlines first offered its team training course, how did pilots respond?

At the time, a lot of us thought it was a waste of time. But we came to recognize the value of the course. It's a good thing to have. I don't care what business you're in.

How did team training mitigate the consequences of Flight 232's loss of hydraulic power?

We were a team, and everyone participated in the decision-making. "Should we try this?" "Will this work?" Nobody hesitated or asked what to do next. We listened to what the other crewmembers had to say.

All our experience and training came out. I've flown with United Airlines 33 years. First Officer Bill Records has 27 years with United. Second Officer Dudley Dvorak flew 26 years in the military. In the case of 232, we also had the experience of Dennis Fitch, a DC-10 instructor who left his seat in the cabin to help us maneuver the plane.

We found ourselves in a whole new world. None of us had ever been in that type of situation. No simulator exercise had prepared us. Loss of all hydraulics just wasn't supposed to happen. We had no procedures to follow.

Murphy's Law says it can happen, so when it does, you've got to pull together. You'd better work as a group instead of as individuals.

You've got to see if you can come up with an answer together. That's what happened for us.

Since training in the simulator didn't specifically prepare you for 232's problems, what do you think of the value of simulator training?

It's invaluable. The simulator couldn't prepare us for 232's problems, but it prepared us for everything else. Our simulators are very realistic. They have movement. When you accelerate, you can feel it. You can feel deceleration and banking.

The simulators are so close to the real thing, we can train without flying the airplane. I don't know how you could possibly train without simulators.

It is true, however, that you can't simulate all conditions. Instructors have tried 45 times to recreate what happened to Flight 232. They haven't been able to do it. You can't duplicate exactly what happened because of the extensive damage we had in the back of the plane.

What happened aboard Flight 232?

We were flying from Denver to Philadelphia, with a stop in Chicago. It was a beautiful summer day, and it looked to be a routine flight. We were up in cruise, on automatic pilot. We'd just had lunch, and I was sitting back with a cup of coffee. We were monitoring the panel, watching what was going on. Without any warning whatsoever, there was a very loud explosion.

Bill immediately took over the airplane. The idea was he'd fly the plane, and the two of us would fix the problem.

I didn't say a word to Dudley. He just picked up the phone and told the passengers we'd lost an engine. The loud explosion had scared the daylights out of everybody. I really believe in communicating with passengers.

We knew we could fly without the tail engine, but not at 37,000 feet, so we started down. Meanwhile, Dudley and I shut the engine down. We had difficulty getting the throttle to close. While we were shutting it down, Bill said, "I can't control the airplane."

I turned around and saw he was calling for maximum left turn and maximum nose up, something you'd never do normally, but we were still in a descent to the right. We were going in the opposite direction from what we wanted.

At that time, we knew we had more than engine failure. I looked back at the Second Officer's panel, and I could see we had no hydraul-

ic pressure. With no hydraulic fluid, we couldn't control the airplane with the yoke, but we didn't know that yet.

Bill and I got on the yoke together because it was so difficult to move without the fluid. Our CLR training immediately came in handy. One of us would call out, "turn right" or "turn left," "push" or "pull," and the other would respond. We immediately began to work together.

While Bill and I worked on the yoke, Dudley (the flight engineer) got out the book we use for emergencies and irregularities. Dudley also radioed our maintenace base to talk to the resident experts about our situation. He had to convince them of our problem—no one believed it possible.

All this time we were still in a descent to the right. We started manipulating the throttle to keep the right wing from going down more. We thought the airplane would go over on its back.

After 10 minutes of this, Dennis, the DC-10 instructor sitting in the cabin, figured out there was something really wrong. He asked the flight attendant to tell us he was available to help. I felt maybe he'd know something we didn't, so I asked him to come on up.

Dennis observed for a minute and couldn't believe what he saw. He asked what he could do to help. I asked him to help us coordinate the throttles, so he stood between Bill and I and began to work the levers. After about five minutes of jiggling, the throttles responded to what Bill and I asked for. Dennis figured out what it took to keep the plane as level as possible.

Here's where CLR worked for us. The three of us were doing just what we needed to do without hesitation. We repeated aloud to Dennis what the air traffic controller was telling us since he didn't have a headset. We'd tell him we needed to turn left, bring the wing up, whatever, and he'd do it.

Bill and I continued to fly the yoke. Maybe we were helping a little bit. The airplane seemed to get more stable. It never was really stable, but it was better as we got lower.

There were three of us up front trying to control the plane while Dudley handled communications. By his being on the radio, the company and maintenance facility were alerted to what was going on. The emergency response program started 30 minutes before we landed. If Dennis hadn't joined our team, Dudley would have been working the throttles, and we wouldn't have had time for communications.

As the airplane became more stable, we could fly at a slower speed. We were down to 180-something knots. Then we started picking up speed. We were close to the ground and I called for Dennis to close the throttles to reduce speed. Dennis said he couldn't because that would cause us to turn.

By the terms of our CLR training, that was a conflict. Two of us wanted something done, and the other didn't. We resolved it immediately. Instead of considering it an order and obeying, Dennis gave his input. No one ever ordered the throttles closed. Everything was a suggestion.

We actually touched down at 210 knots, which is way too fast. We were alongside the runway, off to the left side. We were a lot closer than it appeared we might be, and that was because of the controllers' efforts.

We built a very fragile house of cards. All of us did. There was not one team, but several teams: the cockpit team, the cabin team, the controllers in Minneapolis, the controllers in Sioux City, firemen, rescue teams, ambulance drivers, hospital personnel, the people in the Sioux City area, etc.

There's one group no one ever talks about—the passengers. They kept calm. Of course, they were nervous and frightened—they had to be. They didn't panic like they do in Hollywood versions of crashes. After the plane landed and stopped, they didn't just scurry off, but helped each other. One guy went back and rescued a little baby. Everybody was working together.

How much time transpired between the beginning of the incident and the ending?

About 40 minutes. It seemed like three seconds.

During that time, were you ever distracted?

Reporters asked me if I thought about my family. I didn't. I didn't think of anything but controlling the plane, but subconsciously this must have come to mind. On the cockpit recorder, you can hear me say, "Well Mama, it looks like we're going to get to the baseball games after all." My wife and I are very involved in Little League.

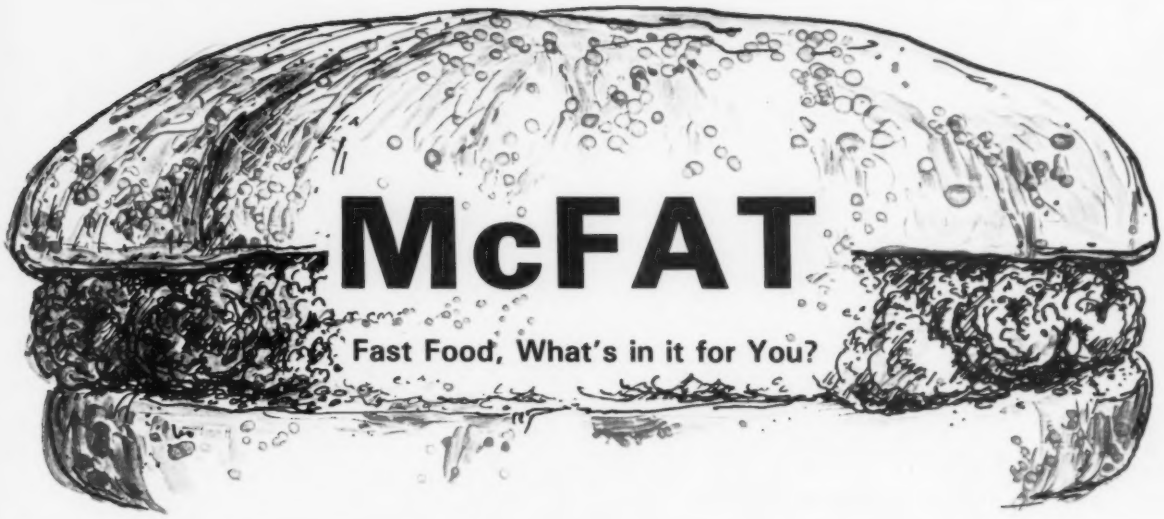
Are you flying again?

Yes, my injuries were very minor—just cuts and bruises. Before returning to work, I practiced on the simulator, and I was very comfortable with that.

In light of Flight 232, how would you define teamwork?

It's working together to get the maximum benefit from each individual. A prime example of everyday teamwork is a sports team. It really comes into play when one of the normal team members is incapacitated and someone else substitutes. You do more than your share to help the substitute so he can do more than he's capable of alone.

Adapted from *Kai Talk* and *NTSB/AAR-90/06.*



McFAT

Fast Food, What's in it for You?

By Peter Mersky

Today's Air Force prides itself on being more aware of health requirements—on being leaner and more fit. Flight surgeons, particularly, are more knowledgeable about what it takes to keep aircrews healthy and trim.

The Air Force, and all the military services, have come a long way in health awareness. For instance, according to the Navy Food Service Systems Office in Washington, consumption of low-fat milk in general messes (GM) in the U.S. has risen to 83 percent of all milk consumed. For GMs afloat and GMs overseas, the figures are 65 percent and 49 percent, respectively.

General messes are also using vegetable oils for deep-fry cooking. Vegetable oils do not have cholesterol.

Yet, anyone visiting or working on a base today will find at least one or two representatives of the fast-food industry with their uniquely American style of burgers, chicken, fish sandwiches, and breakfast bombs. While the industry has begun to respond to consumer-group claims against the nutritional value of these fried-in-oil concoctions, the fact is, burgers, egg-and-sausage sandwiches, and chicken-in-a-bun specialties, hold more than their fair share of problem ingredients and by-products.

McDonald's recently publicized its change to vegetable oil, following Burger King and Wendy's. McDonald's traditionally popular fries got their flavor from the chain's practice of frying potatoes in oil containing beef tallow, high in cholesterol and saturated fat. Hardee's has also switched.

Most people have heard about cholesterol and the value of keeping it in check. They know about fat, calories, sodium, and the effect all these have on the heart. Flight crews are particularly well-educated on eating right.

As lunchtime rolls around, however, the base's fast-food restaurants happily contend with long lines of customers buying hamburgers, cheeseburgers and fried chicken "pieces." (To quote a TV ad of a few years ago, "Parts is parts!")

"Ahhh, I'll work it out later," a diner responds, defensively. Or, "I'll play a fast game of racquetball after work and that'll take care of this stuff. Don't bother me. I'm hungry!"

Sure, when you're 19 or 20, your body accepts a lot more abuse and regenerates itself more quickly. But, by the time you reach 30, your body has begun slowing down and you need to take better care of it.

Whether you're an O-2 or O-5, an E-3 or E-8, you should be aware of the limited advantages of a fast-food breakfast or lunch. Visiting a burger barn at 1130 before your 1330 flight might fill your stomach, but in the long term, it makes your body suffer.

What are your concerns about eating fast food—cholesterol, fat, sodium? In the excessive amounts that Americans consume these usually natural components, the regular daily diet can become a series of bullets fired directly down the throat and into the bloodstream.

Assuming you know blood cholesterol can build up, clog your arteries, and increase your heart's work load, thus increasing your chances for a heart attack, do you

*Figure 1. Selected Nutritional Values of Popular Fast-Food Items**

	Calories	FATS (G.) Total	Saturated	Mono-saturated	Polyun-saturated	Cholesterol (Mg.)	Sodium (Mg.)
BREAKFAST							
HARDEE'S							
Steak & Egg Biscuit	550	32	8	17	7	175	1370
Big Country Breakfast (Sausage)	850	57	16	31	11	340	1980
BURGER KING							
Croissan'wich with Sausage, Egg and Cheese	534	40	13	20	5	268	985
Scrambled Egg Platter with Bacon	610	39	11	20	7	373	1043
McDONALD'S							
Bacon, Egg and Cheese Biscuit	440	26.4	8.22	16.14	2.01	253	1230
Scrambled Egg Breakfast	140	9.8	3.33	5.03	1.44	399	290
SANDWICHES							
HARDEE'S							
Quarter-Pound Cheeseburger	600	29	14	12	2	70	1060
Chicken Fillet	370	13	2	4	6	55	1060
Grilled Chicken Sandwich	310	13	2	4	6	55	1060
9-Piece Chicken Stix	310	14	3	6	5	55	1020
BURGER KING							
Double Whopper with Cheese	935	61	24	22	14	194	1245
Chicken Sandwich	685	40	8	11	20	82	1417
BK Broiler Chicken Sandwich	379	18	3	7	8	53	764
WENDY'S							
Big Classic Hamburger	470	25	unavailable	unavailable	unavailable	80	900
Chicken Breast Fillet	380	12	unavailable	unavailable	unavailable	65	700
McDONALD'S							
Quarter-Pounder with Cheese	520	29.2	11.18	16.25	1.51	118	1150
Filet-O-Fish	440	26.1	5.16	10.22	10.76	50	1030
McChicken Sandwich	490	28.6	5.4	11.5	11.6	42.6	780
SALADS							
HARDEE'S							
Side Salad	20	0	0	0	0	0	15
Chef Salad	240	15	9	1	5	115	930
BURGER KING							
Side Salad	25	0	0	0	0	0	27
Chef Salad	178	9	4	3	1	103	568
McDONALD'S							
Side Salad	60	3.3	1.45	1.59	0.27	41	85
Chef Salad	230	13.3	5.91	6.52	0.91	128	490
POTATOES							
HARDEE'S							
Hash Rounds	230	14	3	7	4	0	560
Crispy Curls	300	16	3	8	5	0	840
BURGER KING							
French Fries (Medium)	341	20	10	9	4	21	241
Onion Rings	302	17	4	8	4	3	559
WENDY'S							
Stuffed Potato with Cheese	590	34	unavailable	unavailable	unavailable	22	450
McDONALD'S							
French Fries (Medium)	320	17.1	7.17	9.21	0.70	12	150

**Information obtained from lists offered by individual chain restaurants.*

know that the recommended daily intake for cholesterol is 300 mg? Many Americans consume at least 350—400 mg of cholesterol every day. A Big Mac contains 103 mg of cholesterol—one-third of the daily allowance in just one, relatively small, item of food. It also has nearly 1,000 mg of sodium, also one-third the daily allowance.

Even with their highly touted switch to vegetable oil, the chain's offerings still pose tremendous problems. Take breakfast, for instance. Nothing like a bacon-and-egg sandwich, right? Maybe a sausage-egg-and-cheese combo? Well, a Burger King Croissan'wich with bacon, egg, and cheese contains 227 mg of cholesterol, as well as 361 calories. Change the bacon to sausage and you raise the count to 268 mg and 534 calories. Hardee's steak-and-egg biscuit has 175 mg of cholesterol and 550 calories.

McDonald's popular Egg McMuffin includes a whopping 226 mg of cholesterol and 290 calories. If you want the really big breakfast at Chez Mac's—the scrambled egg thing—you can ring the bell with 399 mg of heart-stopping cholesterol, well over the daily allowance.

We haven't even covered the sodium content. The body needs salt, but not in the vast quantities many Americans consume every day. Ever watch someone as they reach for the salt, almost by reflex, and pump shake after shake onto their already seasoned meal? Too much salt raises your blood pressure—makes it go sky high—and increases the work load imposed on your heart. Salt retains water and makes you gain weight, again not good for your heart, to say nothing of how you look.

Sodium is one account where the fast-food chains are incredibly overdrawn. For instance, the breakfast sandwiches can contain 800-1,000 mg of sodium. A fairly benign chicken sandwich—the BK Chicken Sandwich, for example—carries 1,417 mg of salt. A Double-Whopper cheeseburger has 1,245 mg of salt, and, oh yes, 935 calories wrapped around 194 mg of cholesterol. Hardee's country ham biscuit contains 1,550 mg of sodium.

One interesting note is that whatever your calorie count each day, you should only have one mg of sodium per calorie. Thus, if you're on a 1,500—calorie diet, you shouldn't have more than 1,500 mg of sodium. One of those great breakfast bombs takes care of your complete sodium allowance.

What about the all-inclusive category—fat? There are three different types of dietary fat: saturated, polyunsaturated, and monosaturated. Saturated fats are bad. They come mainly from animals and are found in such foods as butter and lard. Polyunsaturated fats are more beneficial and don't clog arteries. This "good" fat comes in liquid corn, sunflower or safflower oil and can, some people believe, reduce your cholesterol count. (Liquid oils are much better than "hard" forms, mainly stick margarines which, according to some dieticians, have little advantage over butter. The whipped margarines are better for you; (the softer the form, the better.) Monosaturated fat, found in olive oil, is a neutral type, neither good nor bad, but it may reduce your cholesterol count.

The important thing to remember about fats is that no matter what the type, they are all high in calories and should be consumed sparingly when possible. Remember that one gram of fat contains nine calories.

See Fig. 1 for how the fast-food chains check out in the fat category. An interesting formula for fat content is that each category—saturated, polyunsaturated, and monosaturated—should be no more than 10 percent of the total fat count. So, if a sandwich contains 30 total grams of fat, each of the three categories should be no more than 10 grams. The American diet contains, by a wide margin, too much fat anyway, and by checking the figures here, you can see yourself how bad some of these foods are. Makes you stop and think.

Here are a few suggestions about eating fast food.

-Go easy on french fries. Order a plain potato at Wendy's. Sour cream is better than butter because it has less fat and less calories. Mainly, hold the butter on your potatoes, and go light on the cheese topping. Even a moderate amount of chili is better than butter.

-Drink lowfat milk, if available, rather than milkshakes.

-Eat a salad, but reduce the croutons, bacon bits, and fatty dressings.

-If you have to eat a hamburger, hold the cheese and mayonnaise. Mayo can add nearly 200 calories to the sandwich.

-Roast beef is better than hamburger. It is leaner and usually has more flavor than a fried burger. If you use tomatoes and lettuce from so-called fixins' or salad bars, you can add nutritional value to your sandwich, as well as "build" your sandwich to your own taste.

-Stay away from fried chicken, either as the entree or in a sandwich. Discard the breading when possible. Breading and frying adds more fat to the sandwich. Make sure the chicken is properly and thoroughly cooked. Return the sandwich if the meat is cold or pink.

Yes, people are more conscious of healthy eating habits, but take a look at some of the numbers in your favorite sandwiches and fast food.

Adapted from *Approach*.

TMF INSTRUMENT QUIZ

1. When you check the NOTAMS for Fallon NAS, you note both PAR and TACAN at the field are out of service. A quick check at the weather shop indicates the forecast for your ETA, plus or minus one hour, calls for ceilings of 3,000 feet and visibility of three statute miles. You're flying a Category "C," fixed-wing aircraft. On the IFR flight plan you should:

a. Enter "N/R" in the alternate block on the flight plan.
b. Designate an alternate airport on the flight plan.
c. None of the above.

2. A helicopter filing an IFR flight plan to Fallon under the same conditions would need to file an alternate.

a. True.
b. False.

3. For a Category "C" aircraft to use Fallon as an alternate when this is the only approach, the worst forecasted weather (intermittent or prevailing) for the ETA (plus one hour) must be:

a. 1,000-foot ceiling and 2 miles visibility.
b. 1,000-foot ceiling and 3½ miles visibility.
c. 1,000-foot ceiling and 2½ miles visibility.
d. 1,100-foot ceiling and 2½ miles visibility.

4. The minimum altitude from Mustang to the IAF (HZN 255 degree radial at 10 DME) is:

a. 15,600 feet.
b. 10,000 feet.
c. 9,400 feet.
d. 8,000 feet.

5. Center has cleared you to hold as published at Hazen and to contact Fallon approach control for further clearance. Your aircraft heading is 073-degrees. At Hazen you:

a. Make a standard rate left turn to enter holding.
b. Make a standard rate right turn to enter holding.
c. Turn right to 225-degrees to make a teardrop entry into holding.
d. None of the above.

6. An aircraft that has only TACAN can use the published Hazen holding pattern.

a. True.
b. False.

7. While established outbound in the published Hazen holding pattern at 10,000 feet, approach control clears your aircraft for the approach. You should:

a. Turn in the shortest distance to the VORTAC; after crossing the VORTAC descend to cross the final approach fix at or above 5,000 feet.
b. Begin the descent in the holding pattern and cross the VORTAC at or above 8,000 feet.
c. Turn in the shortest direction to proceed to the IAF (HZN 255/010), after crossing the IAF inbound begin descent to cross HZN at or above 8,000 feet.
d. None of the above.

8. An aircraft with only a VOR and ADF for navigation can fly this approach using timing.

a. True.
b. False.

9. The highest terrain depicted on this approach is:

a. 15,600 feet.
b. 5,350 feet.
c. 4,242 feet.
d. 5,513 feet.

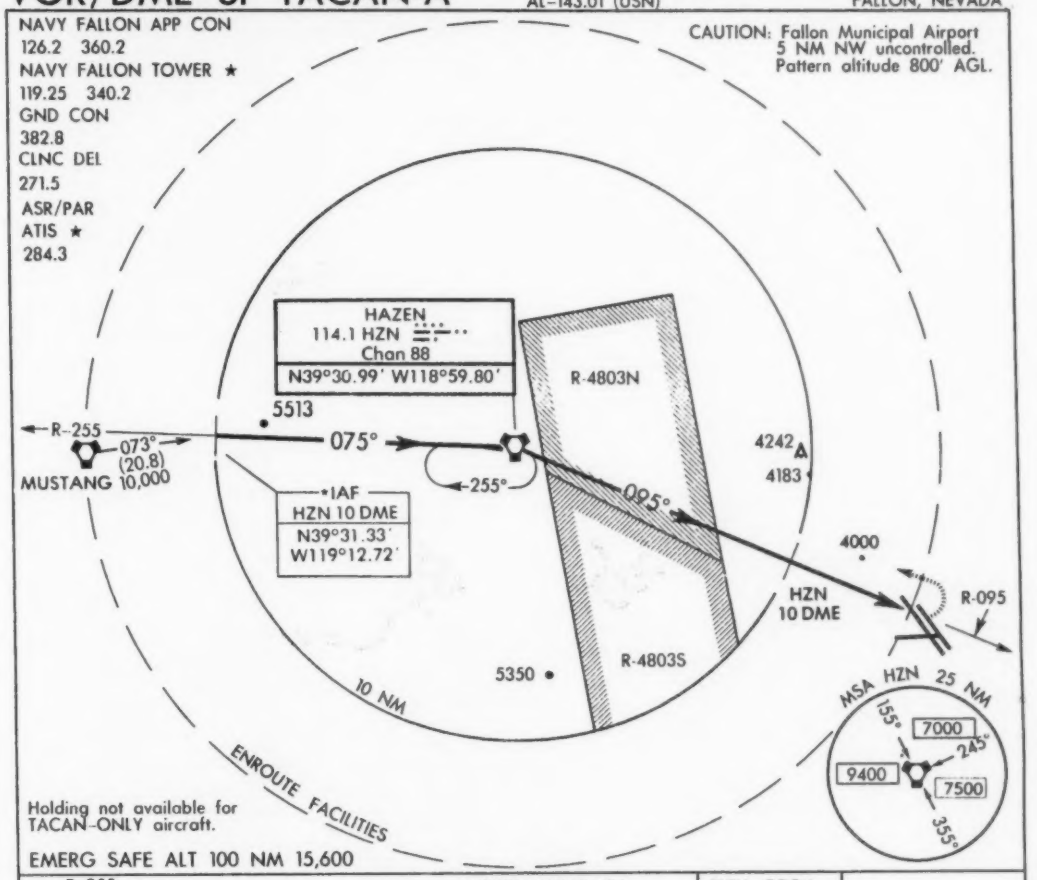
10. When passing the FAF, how far from the runway are you?

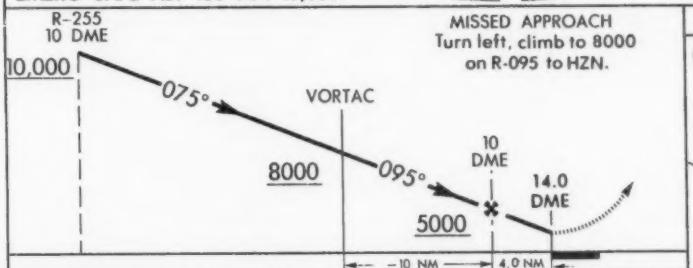
a. 10 DME.
b. 4 DME.
c. 4 nautical miles.
d. There's no way of knowing.

VOR/DME or TACAN-A

FALLON NAS (VAN VOORHIS FIELD) (NFL)

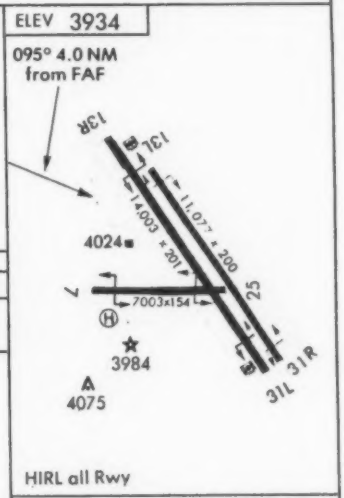
AL-143.01 (USN) — FALLON, NEVADA





CATEGORY	A	B	C	D
CIRCLING*	4380-1 446 (500-1)	4400-1 466 (500-1)	4400-1 ½ 466 (500-1 ½)	4520-2 586 (600-2)

*IAF at "HZN" VORTAC at MEA when commencing approach from holding pattern. Decend to cross VORTAC at or above 8000



FAF to MAP 4.0 NM					
Knots	60	90	120	150	180
Min:Sec	4:00	2:40	2:00	1:36	1:20

VOR/DME or TACAN-A

39°25'N-118°42'W — FALLON, NEVADA

FALLON NAS (VAN VOORHIS FIELD) (NFL)

THE ANSWERS

1. b. Designate an alternate airport if, during the period one hour before, until one hour after the ETA, the worst weather (intermittent or prevailing) is forecast to be less than: ceiling—3,000 feet; or visibility—three miles, or two miles more than the lowest compatible published landing minimum visibility, whichever is greater. When the two miles more than lowest visibility is added to the mile and one half approach visibility mimimums, the forecast weather isn't good enough to file without designating an alternate. (AFR 60-16, para. 8-5a.)
2. b. False. Helicopters need to designate an alternate when the worst weather is forecast to be less than a ceiling of 700 feet, or a visibility less than one mile, during the period one hour before, until one hour after the ETA. (AFR 60-16, para. 8-5b.)
3. c. 1,000-foot and 2½ miles visibility. For an airport to qualify as an alternate, the worst forecasted weather for the ETA, plus one hour, must have a ceiling of 1,000 feet, or 500 feet above the lowest compatible published landing minimum, whichever is higher; and a visibility of two miles, or one mile above the lowest published landing minimum, whichever is higher; for a fixed-wing aircraft. (AFR 60-16, para. 8-6a(1).)
4. b. 10,000 feet MSL. (Instrument Approach Procedure, Plan View.)
5. b. The angular difference between the holding course and the heading at initial holding fix passage determines the direction of turn to enter the holding pattern. The holding course is within 70-degrees of the aircraft heading, turn outbound on the holding side to parallel the holding course. For a standard pattern (which it is), turn right to enter. (AFR 51-37, para. 9-5a(1).)
6. b. False. AFM 55-9, TERPS, states that the use of TACAN station passage as a fix is not acceptable for holding fixes. Therefore, do not hold directly over a TACAN or VORTAC facility or plan to use these facilities as high altitude IAFs if the aircraft is TACAN only equipped. (AFM 51-37, para. 9-3b.)
7. b. Begin descent in the holding pattern and cross the VORTAC at or above 8,000 feet. (AFM 51-37, para. 12-3d.)
8. b. False. This is a VOR/DME or TACAN approach. The slash (/) indicates that more than one type of equipment may be required to execute the final approach. For this approach, DME is used to determine the final approach fix. No other means of locating the FAF is shown. (AFM 51-37, para. 7-6a(3)(a).)
9. d. 5,513 feet.
10. c. 4 nautical miles as shown in the profile view.
11. d. OLS and HIRL. (IAP, Airport Sketch.)
12. c. When more than .75-degrees above or below the glide slope, the meatball will disappear. When in doubt, assume you are below the glide slope. (AFM 51-37, para. 14-3f.)
13. c. Approximately seven feet high. This makes it an obstruction for most MAC aircraft. (FLIP Terminal Legend.)
14. a. True. When the control tower and rotating beacon are co-located, the beacon symbol will be used and further identified as "TWR." (FLIP Terminal Legend.)

11. Runway 13R is equipped with the following lighting systems:

a. VASI.
b. MALSR and HIRL.
c. REIL, HIRL, and OLS.
d. OLS and HIRL.
e. Both a. and b.

12. You have told the other pilot that you will be using the OLS for glide path reference. You don't see the large yellow light (meatball), but can see the two rows of green (datum) lights.

a. You are well above the glide slope envelope.
b. You are more than .75 degrees above the glide slope.
c. You are more than .75 degrees above or below the glide slope.
d. The OLS is not turned on.
e. None of the above.

13. After you mention the OLS, another crewmember asks how tall it is. You tell them:

a. 4 feet.
b. 5 feet, 11 inches.
c. Approximately 7 feet.
d. You don't know.

14. At Fallon the airport beacon is not colocated with the control tower.

a. True.
b. False.

C.R. TERROR

The Dauntless Driver Discovers his Dash-One.

"That completes the pre-departure crew brief . . . crew bus is waiting out back," announced the Able Aeronaut. "Time to drag bags; of course, I'll personally carry my precious hand-tooled baby-blue B-4 bag."

"Boss, don't you think you ought to take those Dash-One safety supplements, the ops supplement, and the IMC to Chapter 6 out of your V-file?" inquired Capt. L. S. Sam. "You did sign off an FCIF item for them."

"Nonsense, m'boy. I can't waste my valuable time on namby-pamby stuff like pen and ink changes. Have no fear my faithful followers, Maj. MacZamminer is confined to his cubicle in the brick pile, what with the demise of no-notice checkrides. If those changes are really as important as you claim, they'll reprint the entire chapter for quick easy filing. Our trusty Starlifter will fly better without the excess weight of those tomes. Let's be off and get those TF-33s turnin-n-burnin," finished C.R.

Flight planning, weather, and a command post briefing behind them, C.R. and crew were ready to start engines and write a new chapter in airlift history. As usual, winter's fury had taken a toll on the ramps and taxiways of the Garden State's finest MAC base. Construction barricades were springing up all over. Mounds of dirt along the taxiways made it appear as though monster moles had infested the area. As the Starlifter pulled out of the temporary alternate hot cargo spot, Sammy could tell it was going to be an arduous journey simply to reach the runway.

"Boss it looks like we'll be taxiing five miles to reach the runway today with taxiway 'Zulu' closed. The only taxiway fully open is the parallel," stated Sammy.

"Tut, tut, Samuel m'boy. We'll have no problem getting to the active. Our only concern is taking off before our delay start time, which will be easy," boasted the Ace of Aerospace.

"Easy if we don't make a wrong turn and wind up backing up on one of the closed taxiways,"

came an unidentified voice over interphone.

"Sammy, call for takeoff clearance. My Rolex Oyster Perpetual Chronometer indicates we are now five minutes from our scheduled takeoff time."

Despite being a good 4,000 feet from the approach end of the runway, Tower cleared the Starlifter for takeoff, hoping to get MAC 1313 airborne so normal airfield operations could be resumed. Colonel Fang had instituted a policy of no airfield movements whenever C.R. was taxiing an aircraft. It prevented innocent bystanders from becoming involved with the Ambient Aeronaut's often hazardous taxi techniques. In any case, Colonel Fang's ulcer was now responding to treatment and damage to airfield construction equipment was on the decline.

The Starlifter bounced along the taxiway as it approached the runway. As the turn to the active drew close, C.R. jumped on the binders, much as he did when driving his E-type Jaguar. The nose tires skidded briefly as the C-141 arrived into position, ready for takeoff.

As MSgt. Max Torque called the "line up check" complete, the Master Manipulator was pushing the throttles to takeoff EPR. As indicated airspeed climbed toward 95 knots, the "Master Caution" and "Door Open" lights blinked on.

"REJECT!" screamed the Addled Aviator, as he yanked the throttles to idle and then into reverse thrust. "Sammy, get a call off to tower about our emergency."

"Boss, we have a 'Door Open' light, not an emergency," replied the Long Suffering copilot. "I'll ask them to hold our clearance open. Shouldn't we check the brake energy charts before we attempt another takeoff?"

"Pilot, loadmaster. Looks like your package marked 'fragile' that you tied down back here fell on the troop door handle. It must have been just enough to trip the micro switch for the light," announced TSgt. Ty Downs. "I'll secure it with the crew bags."

"Don't worry about that brake energy chart, Sergeant Torque. I was barely on them. They'll be cool by the time we get back to

number one again; it's all up hill so I won't even touch the brakes," remarked C.R. "If I taxi fast enough, we can still take off without getting a delay."

After what seemed the longest nine minutes of taxiing, the Starlifter was once again taking the active for departure, with time to spare before getting a delay. Not once had C.R. touched the brakes during taxi. Airspeed increased toward go speed and all systems were normal. About the same time Sammy called "Go," a muffled bang and rumble emerged from the main gear area. The rumble ceased as the C-141 lumbered into the sky. Before the Field-grade Fumbler could call for gear-up, Sammy pointed out an unsafe bogey.

"Right you are Sammy. Leave the gear down and ask for vectors to a box pattern. Approach will keep us out of the way of other traffic. Once we're safely in the radar pattern, we can concentrate our efforts on fixing the gear problem. I'll fly while you and Sergeant Torque take care of the situation. Of course," added the Skyways Sultan, "I'll provide you with my vast wealth of systems knowledge. I have a checklist here someplace."

C.R. began rummaging in his black patent leather book case for his checklist. The checklist was wrapped in his violet scarf, neatly tucked under the portable potable kit, and covering a well-perserved C-ration box. Some pages were stuck together with what appeared to be grape jelly. Peeling apart the pages, C.R. announced he was ready to assist with the troubleshooting.

"What page are you on? What circuit breakers do you want me to pull?"

"None, sir," replied Max over interphone. "We need Sergeant Downs and the scanner to check both main landing gear areas before we start. We want to know if there's any damage before we go too far."

"Pilot, loadmaster. The scanner is on his way back to the right side and I'm taking the left. We'll have a verdict on damage shortly. It'll take a couple of minutes to get the access panels off so we can see out the inspection windows. I'll be off interphone for a short time."

For the Able Aeronaut, the next few minutes were agonizingly slow, as he read the index for the emergency checklist section, searching for the unsafe bogey checklist. His limited attention span wandered back to scanning outside just in time to see a red and white aircraft pass under the nose. A quick, somewhat shaky call to ATC revealed they didn't have the aircraft on radar.

"Pilot, scanner. Looks like we blew one or two tires on the right side. No damage to the bogey or strut. Wind noise back here sounds funny, kind of like a flapping sound."

"Pilot, engineer. We still have safe indications on the gear and an unsafe bogey. Since there's no other damage, we can land once we're down to max landing weight."

"Okay. Start dumping fuel, engineer. Sammy, call command post. Tell them of our dire circumstances and that we're dumping fuel. I'll tell ATC to clear the airspace under us for the fuel dumping." The Ace of Aerospace was now in his element, giving orders and once again almost in control of his destiny. "Let me know as soon as we're down to landing weight, engineer."

As soon as the scanner was in position to monitor the fuel dumping, Max opened the dump valves and 90,000 pounds of JP-4 was on its way out the dump masts. Much to everyone's relief, both jettison valves closed when the jettisoning was complete. The Starlifter, now down to a reasonable landing weight, was vectored back to base.

The ILS approach was nearly flawless, much to the awe of the crew, until they realized the autopilot was flying the plane, not C.R. When he took control at 200 feet, there was no doubt who was flying the aircraft.

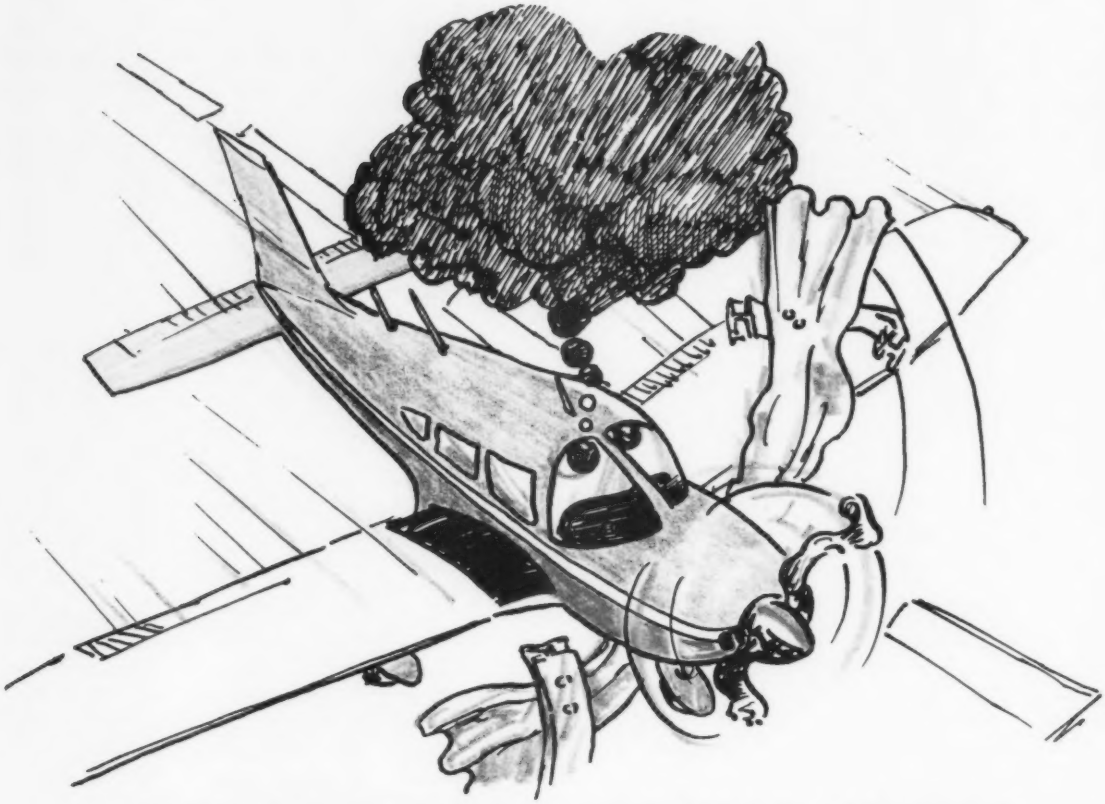
The landing was a little rough, but C.R. stayed on centerline until coming to a complete stop. Fire trucks converged on the wounded Starlifter. In the distance, maintenance trucks and a tug were approaching. There was no crew bus in sight—just the DO's staff car coming down the runway.

To everyone's amazement, Colonel Fang didn't head straight for the cockpit. Instead, he went with the DCM to look over the landing gear. A look of relief spread across the Pompous Pilot's face. He might escape a tailectomy just this once.

"Major Terror," boomed the all-too-familiar voice of Colonel Fang, "you did a fine job. Probably a first for you. When I heard MAC 1313 was dumping fuel for an emergency return, I thought you might have another TPLC light like your 'emergency' last week. Glad to see you've gotten into the Dash-One for a change."

The Magic Major was struck speechless. Before he could mention his superior airmanship and systems knowledge, Colonel Fang was gone from the flight station. Sheepish grins and wagging heads filled the cockpit. Once again, only his faithful crew knew the real story.

QUICKSTOPPERS



INFORMATION COMES FROM MANY SOURCES

The pilot of this aero club Piper thought he was doing everything by the book. Before departing on his cross-country, he received a weather briefing at base ops and proceeded to the military flight planning room to check NOTAMS. He checked the NOTAMS on the military board and hourly update, not realizing the civil airport information he required was not contained in the military NOTAMS but in the Class II NOTAM file produced by the FAA. The information he needed was also available through Flight Service. The pilot was subsequently cleared by the aero club clearance authority (since all blocks on the aero club cross-country checklist were complete).

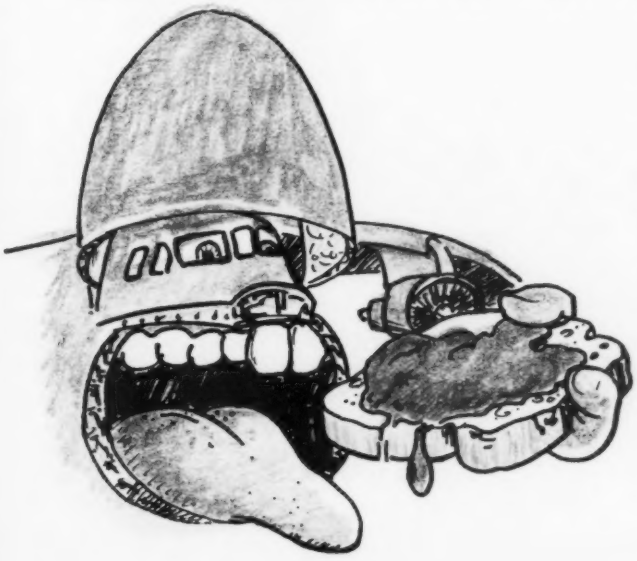
Preflight and flight were uneventful until transition for a full stop landing at destination. Center cleared him for a VOR approach to Runway 27, which the pilot flew down to between 25 and 50 feet AGL. For reasons unknown, he did not notice the large "Xs" indicating closure, painted on the runway. Feeling he was committed, he made an inappropriate decision to land instead of go around. The aircraft impacted a metal barrier, bending the prop and throwing pieces of the barrier back to the left gear, tearing off the gear door and denting the left flap. Neither the pilot or passengers were injured. Recommendations included a requirement for all aero club pilots to specifically request NOTAM information from the local FSS before all cross-country flights and en route, as necessary. It only makes sense to use all available information.

Just When My Drop Scores Were Good

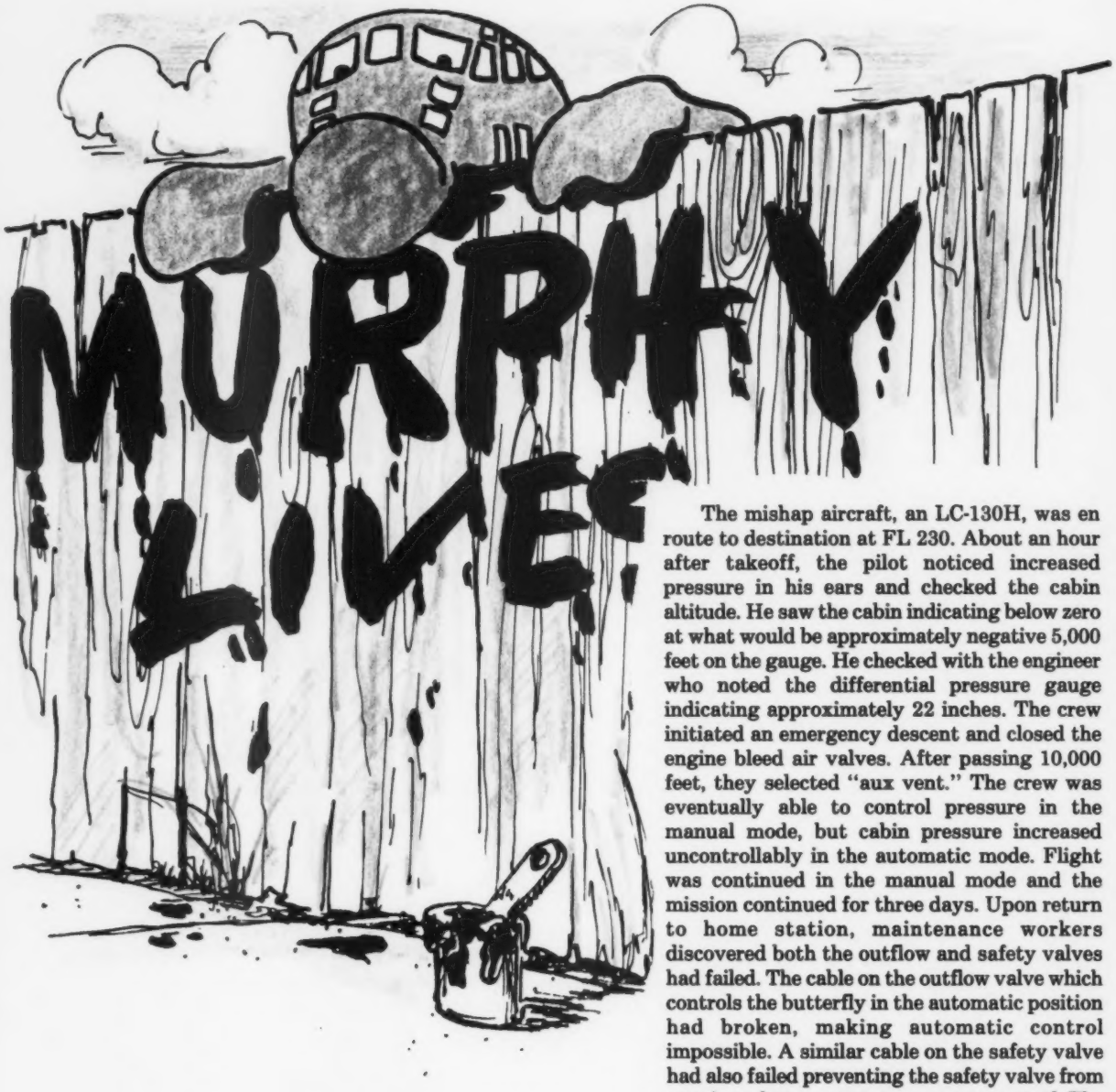
During the run-in to the DZ for a heavy equipment airdrop the crew performed a normal slowdown maneuver. When the ramp and door fully opened, the extraction parachute came out of the release mechanism without aircrew intervention. Fortunately, neither loadmasters nor aircraft were injured or damaged as a normal load extraction occurred. The airdrop platform and parachutes didn't fair as well when they landed six miles short of the DZ in an unpopulated area. As directed in current C-130 airdrop procedures, the aircrew had installed a plastic safety cap over the chute release button to prevent an inadvertent airdrop.

Investigation revealed that an improper pushbutton switch was installed, and with the ADS safety cap installed correctly, the chute release switch was depressed. As soon as the ramp and door were fully opened during slowdown, the air-drop release circuit was completed. Murphy is alive and well.

Flight Controls Jammed—Not With Black Raspberry Either



Four days earlier, this C-5 had made a 45-degree uncommanded left roll during a local trainer. After extensive ground tests of computers and servos, the discrepancy was cleared. On the first flight, the aircraft flew 30 minutes, landed to disembark a crewmember, and took off again. About one and one-half hour into the local, the flight controls jammed. When the pilot tried to make a left turn, the control yoke would not move past neutral. A second try produced similar results, but persistence paid off on the third attempt when resistance disappeared. A full stop landing followed. Maintenance rechecked the flight control computers and servos with no problems noted. When all wing flight control access panels were removed, maintenance found a chaffed flight control cable and bell crank. The folks who worked on the Galaxy said this wouldn't cause controls to jam. So, what *really* caused the chaffing and jamming?



The mishap aircraft, an LC-130H, was en route to destination at FL 230. About an hour after takeoff, the pilot noticed increased pressure in his ears and checked the cabin altitude. He saw the cabin indicating below zero at what would be approximately negative 5,000 feet on the gauge. He checked with the engineer who noted the differential pressure gauge indicating approximately 22 inches. The crew initiated an emergency descent and closed the engine bleed air valves. After passing 10,000 feet, they selected "aux vent." The crew was eventually able to control pressure in the manual mode, but cabin pressure increased uncontrollably in the automatic mode. Flight was continued in the manual mode and the mission continued for three days. Upon return to home station, maintenance workers discovered both the outflow and safety valves had failed. The cable on the outflow valve which controls the butterfly in the automatic position had broken, making automatic control impossible. A similar cable on the safety valve had also failed preventing the safety valve from opening when an over-pressure was sensed. The failures, although similar, were unrelated. Environmental specialists indicated they had never seen similar failures before. Time to check flightsuit pockets to see who has the snake.

After Deadlines

COMMAND WINS TWO—The Military Airlift command has been awarded the Secretary of the Air Force and the Major General Benjamin D. Foulois Memorial Awards (Daedalian Flight Safety Award) for 1990. These awards recognize the MAJCOM with the most effective safety program in all functional areas and the most effective flight safety program, respectively. Receipt of both awards in the same year by one command is a significant milestone achieved only five times in the 24-year history. Congratulations to all men and women in the Military Airlift Command and MAC-gained Air Reserve Components.

YET ONE MORE—Aviation Week and Space Technology magazine selected Gen. H. T. Johnson and the men and women of the Military Airlift Command as winners of the 1990 Aerospace Laureate Award in Operations. The magazine cited General Johnson, commander in chief of the U.S. Transportation Command and MAC, and the people of MAC for "operating one of the largest and most successful airlifts in U.S. history in support of Operation Desert Shield."

ONE MORE KUDO—SSgt. Samuel J. Alden, Jr., 17th Tactical Airlift Squadron, Elmendorf Air Force Base, Alaska, was selected for the USAF Well Done Award which recognizes ". . . outstanding feats of airmanship or support to aircrew that have prevented or reduced the effects of a serious flight mishap." Sergeant Alden's heroic efforts and professionalism during an in-flight emergency saved the life of a paratrooper. Congratulations!

UNFORTUNATE SWITCH—Due to a printing error, the pictures of TSgts. Mary M. Rowe and Loretta A. Cox' (Safety NCO of the Year recipients) were transposed in the Feb 91 issue of *TMF*. We sincerely regret the error. Correct identification is printed below.

Primary Duty

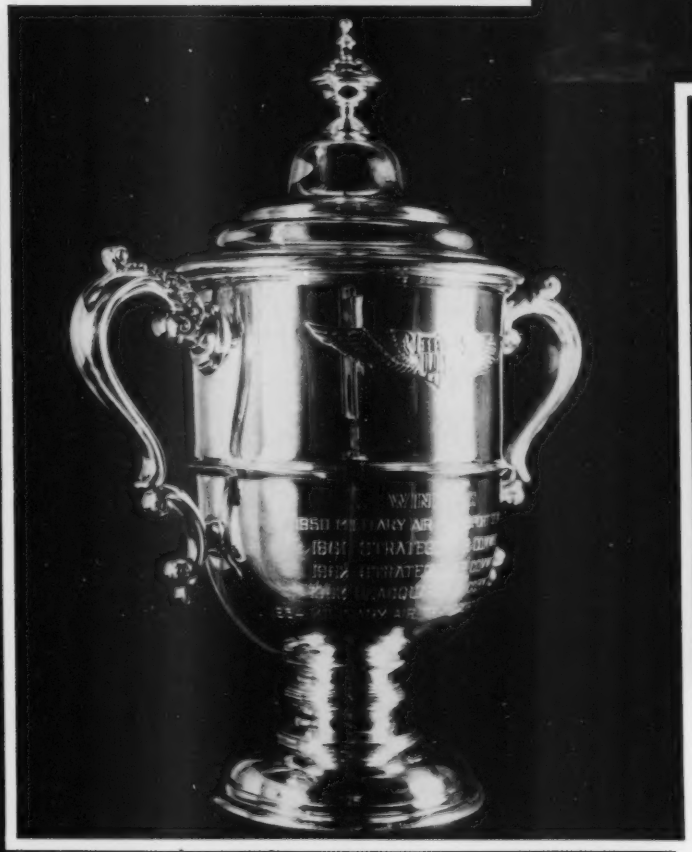
TSgt. Mary M. Rowe
619 MASS

Additional Duty

TSgt. Loretta A. Cox
41 ARS

★ U.S. GOVERNMENT PRINTING OFFICE: 1991-554-015/40005

Secretary
of the
Air Force
Safety Award



Major General
Benjamin D. Foulois
Memorial Award